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## Impact of varied types of bilateral training on endurance among women netball players

**B Periyanyaki and Dr. R Chinnaiyan**

### Abstract

This study was to find out the effects of varied types of bilateral training (bilateral resistance training and bilateral plyometric training) on endurance among women netball players. To conduct this study, 45 female netball players aged between 18 and 25 years studying at various colleges in Trichy district of Tamil Nadu were selected as subjects. The selected subjects were divided into three equal groups, Group I (n=15) underwent bilateral resistance training, Group II (n=15) underwent bilateral plyometric training and group III (n=15) served as a non-participating control. Particularly attend training. The training program for this study will be conducted for 12 weeks, her 3 days per week. All the subjects are informed about the nature of the study and their consent is obtained in order to get their co-operation on till the end of the experimental and training period. The subjects were tested on endurance before and after the training period. Prior after the training period endurance was measured by using coopers 9 min run/walk test. Analysis of Covariance (ANCOVA) was applied as statistical tool for the present study. The Scheffé S test was used as post-hoc test at whatever point the 'F' - ratio of the adjusted post-test means were discovered to be significant at 0.05 level of significance. Both, bilateral resistance training and bilateral plyometric training group influence on endurance when compared with control group.

**Keywords:** Bilateral resistance training and Bilateral plyometric training and Endurance

### Introduction

Netball is now the most popular women's sport in Australia, New Zealand, the United Kingdom, the Caribbean, South Africa and Malawi, and continues to grow strongly with an international federation of approximately 60-member countries. In 1895, students at Madame Osterberg College of Physical Training in Hampstead, England, played netball for the first time. Back then, it was known as women's basketball. There were no printed rules or court lines. There were no circles or boundaries as we know today. Instead of goal posts, they had to make do with two wastebaskets, one of which was hung at each end of the hall.

Bilateral training includes various training techniques that use both limbs to complete a task. A widely used training format in clinical practice is assisted bilateral training. The latter connects two arms so that the unaffected arm holds the affected arm while both move along the same trajectory. Assisted bilateral migration is not discussed due to lack of evidence. Other bilateral paradigms with evidence of efficacy are also discussed, including bilateral kinematics training (BIT), machine-assisted bilateral training, bilateral mirror therapy, and bilateral priming. Readers should note that some bilateral therapy studies have used reinforced feedback, i.e., feedback that is not included in the task. Feedback may include, for example, auditory stimulation using a metronome or electromyography-induced neuromuscular stimulation (E-Stim).

Trained individuals who are strong in a bilateral lift, such as the barbell chest press tend to have a good strength transfer to the unilateral variation, like the single-arm dumbbell chest press in a relatively short amount of time. The bilateral lifts have been a staple lift in exercise programming for generations of fitness professionals and practitioners, helping develop some of the most aspiring physiques and physical capabilities we have ever seen, so something must be working.

Resistance training is a common place for team sport athletes with the ultimate aim being the transfer of heightened physical capacity to superior sporting performance. Both bilateral and unilateral strength training improve muscle strength.

General adaptations associated with improvement result in faster muscle contraction speed, faster motor unit activation, increased neuron firing rate, shorter length-shortening cycle duration, and improved proprioception. However, certain adjustments will occur depending on the training materials used. Unilateral strength training and plyometric training are becoming increasingly popular, especially among athletes in their sports.

Plyometric training involves jumps and hops that build muscle through cycles of muscle lengthening and shortening (Hakkinen K, 1985) [3]. This can be recognized by the rapid deceleration of the mass followed by its rapid acceleration in the reverse vertical direction. For the lower extremities, plyometric training includes exercises such as jumping up and down from high boxes or platforms.

Plyometric training consists of quick eccentric actions followed immediately by targeted muscle and connective tissue actions, with the aim of developing the maximum possible strength in a short period of time. Bi-lateral plyometric training (BPT) are movements produced by both limbs. Bilateral exercises utilize the two limbs as one to interchange a load with the goal that the resistance is being shared between two limbs, Example: - Plyo jacks.

Muscular endurance refers to the ability to perform a specific muscular action for a prolonged period of time.

**Statement of the problem:** The purpose of the present study

was to find out the effects of varied types of bilateral training (bilateral resistance training and bilateral plyometric training) on endurance among women netball players.

### Methodology

To conduct this study, 45 female netball players aged between 18 and 25 years studying at various colleges in Trichy district of Tamil Nadu were selected as subjects. The selected subjects were divided into three equal groups, Group I (n=15) underwent bilateral resistance training, Group II (n=15) underwent bilateral plyometric training and Group III (n=15) served as a non-participating control. Particularly attend training. The training program for this study will be conducted for 12 weeks, her 3 days per week. All the subjects are informed about the nature of the study and their consent is obtained in order to get their co-operation on till the end of the experimental and training period. The subjects were tested on endurance before and after the training period. Prior after the training period endurance was measured by using cooper's 9 min run/walk test.

### Analysis of data

The data collected prior to and after the experimental periods on bilateral resistance training and bilateral plyometric training and control group were analysed and presented in the following table -I.

**Table 1:** Analysis of covariance on endurance of bilateral resistance and plyometric training groups and control group

	BRT Group	BPT Group	Control Group	SOV	SS	df	MS	'F'
Pre-test mean	1674.23	1668.25	1675.54	B	16.26	2	8.13	0.754
SD	5.48	5.29	5.49	W	51.11	42	9.63	
Pre-test mean	1742.56	1796.26	1678.36	B	19.28	2	9.64	8.114*
SD	4.84	4.85	4.58	W	44.10	42	12.63	
Adjusted post-test mean	1712.63	1774.16	1675.98	B	51.03	2	25.02	35.563*
				W	23.41	41	6.93	

\* Significant at 0.05 level of significance.

(The table value required for significance at 0.05 level of significance with df 2 and 42 and 2 and 41 were 3.222 and 3.226 respectively).

Table-I shows that the pre-test mean scores of endurance of bilateral resistance training group is 1674.23, bilateral plyometric training group is 1668.25 and control group is 1675.54. The post-test mean shows reduction over the pre test scores due to twelve weeks bilateral resistance and plyometric training program and the mean values recorded are 1742.63, 1796.26 and 1678.36 respectively.

The obtained 'F' value on pre-test scores 0.754 is less than the required 'F' value of 3.222 to be significant at 0.05 level. This proves that there is no significant difference among the groups at initial stage and the randomized assignment of the subjects into three groups are successful.

The post test scores analysis proves that there is significant difference among the groups, as the obtained 'F' value 8.114

is greater than the required 'F' value of 3.222. This proves that there is significant difference among the post-test means of the subjects.

Taking into consideration of pre and post-test scores among the groups, adjusted mean scores are calculated and subjected to statistical treatment. The obtained 'F' value of 35.563 is greater than the required table 'F' value of 3.226. This proves that there is significant differences existed among the adjusted means due to twelve weeks of bilateral resistance and plyometric training programme on endurance.

Since the significant improvements are recorded, the results are subjected to post hoc analysis using Scheffe's Confidence interval test. The results are presented in table - II

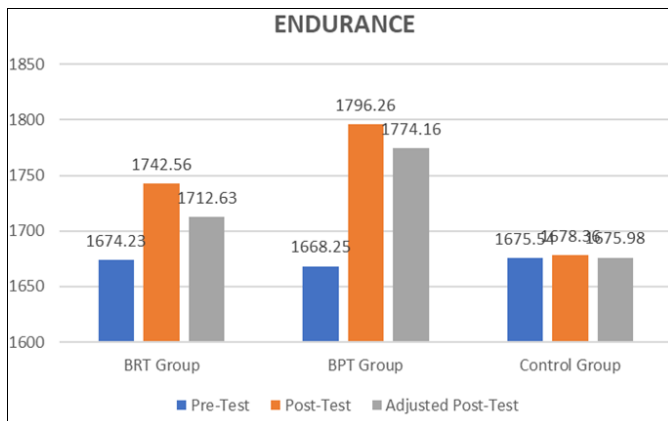
**Table 2:** Scheffe's confidence interval test scores on endurance

Adjusted post-test means			Mean Difference	Confidence Interval Value
Bilateral resistance training group	Bilateral resistance training group	Control Group		
1712.63	1774.16		61.53*	0.546
1712.63		1675.98	36.65*	
	1774.16	1675.98	98.18*	

\*Significant at 0.05 level.

As the confidence interval required to be significant at 0.05 level is 0.546 and the obtained values are greater than the required value, it is observed that the significant difference is

found to be existed. The ordered adjusted means on endurance are illustrated through bar diagram for better understanding of the results of this study in figure-IV



**Fig 1:** Adjusted post-test mean values on endurance of bilateral resistance and plyometric training groups and control group

## Conclusion

From the analysis of the data, the following conclusion were drawn.

The present study shows that there was a critical increase in endurance for bilateral resistance and plyometric training groups when compared with control group. In addition, the results of the tests shows that there was significant difference established between experimental and control groups.

## Recommendations

The following recommendations were drawn, from the results of the present study:

1. Further studies may be made to investigate the effect of bilateral resistance and plyometric training on bio-motor and skill performance variables after considering diet as a control variable.
2. Similar study may be attempted by selecting the university, state or national level netball players as subjects.
3. The effect of bilateral resistance and plyometric training can be assessed on other fitness and co-ordination and physiological factors.
4. Similar study may be conducted by psychological variables as dependent variables.

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