



ISSN: 2456-0057  
IJPNPE 2019; 4(2): 134-136  
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www.journalofsports.com  
Received: 04-05-2019  
Accepted: 06-06-2019

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## Effect of plyometric exercises on dynamic Balance among the Kho-Kho players

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### Abstract

The aim of the study was to determine the effect of plyometric training on dynamic balance. Sixty Kho-Kho (N=60) were randomly selected as subjects and their age ranged between 16 and 18 years. The selected subjects were randomly assigned into two equal groups with thirty subjects each (N=30). Group I experimental, Group II Control group the experimental groups underwent their respective experimental treatment for twelve weeks 3 days per week and a session on each day. Control group was not exposed to any specific training apart from their curriculum. Static balance. was taken as variable for this investigation. The pre and posttest were conducted one day before and after the experimental treatment. Analysis of covariance (ANCOVA) was used to analysis the collected data. Scheffe's test was used as a post hoc test to determine which of the paired mean differed significantly. The results revealed that There was also a significant difference between experimental groups on dynamic balance ( $P \leq 0.05$ ) Further it related that the plyometric training and plyometric training produced significant improvement ( $P \leq 0.05$ ) on dynamic balance as compared to control group.

**Keywords:** Plyometric training, dynamic balance

### Introduction

Sport has been a part of civilized societies throughout history. In some cases, as in Greece in the fifth century B.C, sport was of central importance to culture and has been studied and analyzed by scholars on many disciplines over the past 50 years. Most scholars agree that sport is a manifestation of play and that sports are institutionalized forms of play. Sport involves ritual and it involves tradition.

The very elaborations of sport, its internal conventions of all kinds, its ceremonies, its endless meshes entangling itself for the purpose of training, testing and rewarding the rousing emotion within an individual to find a moment of freedom. Freedom is that state where energy and order merge and all complexity is purified into a simple coherence of parts and purpose and passions that cannot be surpassed and whose goal could only be to be itself.

### Dynamic balance

It is the ability of an individual to maintain stability during vigorous movement. Balance is the ability to stay upright or stay in control of body movement, and coordination is the ability to move two or more body parts under control, smoothly and efficiently. Static balance is maintaining equilibrium when stationary, while dynamic balance is maintaining equilibrium when moving. The creation of a mature athlete necessarily passes through the expression of his potential during each phase of his development. Young athletes' trainers often neglect specific balance programs, above all in certain sports (e.g. soccer) where balance is poorly considered, but that is fundamental for the execution of complex technical movements, as well as for the prevention of future injuries. In this paper we highlight that balance training at specific ages is important for the maturation of the sensorimotor abilities that are important for a high level athlete. We discuss the main methods used to assess balance in sports, including some useful formulae that can be used to quantify postural performances, and we report the major findings concerning static and dynamic analyses on children and adolescents. Finally, we discuss the existing literature regarding balance recordings on adults, adolescents and children involved in one or more sport activities at regional, national or international level, highlighting the need of

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further research on the mechanisms underlying balance improvements related to different sport activities at various ages.

The word Plyometrics is derived from the Greek word *pleythyein* meaning “to increase” or from the Greek roots *plio* and *metric* meaning ‘More’ and ‘Means’. Plyometrics refers to exercises that enable a muscle to reach maximal strength in as shorter time as possible. Plyometrics exercises are important in sports requiring high levels of speed strength (ability to exert maximum force during high speed activity) to complete movement such as sprinting, jumping and throwing.

**Methodology**

For the purpose of this study, 60 Male Kho-Kho players who has played in the Senior state championships from different districts of Kerala were selected as the subjects. The age of the subjects ranged between 17 to 25 years. The subjects were

informed about the nature of the study and their consent were also taken before involving them as subjects of the study. The subjects were later randomly assigned to a control group and to an experimental group of equal sizes. Sixty male Kho-Kho Players (N=60) were randomly selected as subjects and their age ranged between 17 and 25 years. The selected subjects were randomly assigned into four equal groups with thirty subjects each (N=30). Group I experimental, Group II Control group The experimental groups underwent their respective experimental treatment for twelve weeks 3 days per week and a session on each day. Control group was not exposed to any specific training apart from their curriculum. dynamic balance was taken as variable for this investigation. The pre and post test were conducted one day before and after the experimental treatment.

**Result and Discussion**

**Table 1:** Analysis of Co-Variance Done Among the Two Groups on Dynamic Balance

	Control group	Experimental group	Source of Variance	Sum of Squares	df	Mean Squares	F-ratio	P-value
Pre-test Mean	45.700	42.367	Between	166.667	1	166.667	1.248	0.268
S.D.	11.348	11.758	Within	7743.267	58	133.505		
Post-test Mean	46.433	47.867	Between	30.817	1	30.817	0.271	0.605
S.D.	11.301	9.996	Within	6600.833	58	113.807		
Adjusted Post-test Mean	44.967	49.333	Between	279.951	1	279.951	26.345*	0.000 <i>P</i> < .001
S.D.	0.598	0.598	Within	605.694	57	10.626		

\* significant at 0.01 level as the P-value is < 0.01

The Table-1 contains all the relevant factors related to analysis of co-variance done on the variable Dynamic Balance. The post-test values are the values of the variable Dynamic Balance, while the pre-test variable was taken as the co-variate. The P-value of 0.268 associated with the pre-test scores indicates that, there is no significant difference between the means of the pre-scores of control and experimental group. Again a P-value of 0.605 associated with the post scores implies that the post mean scores are not significantly different. Further, the said table do indicates an F-ratio of 26.345 on the adjusted post-test means, and this do implies that there existed significant mean difference on the variable Dynamic Balance between the control group and experimental group, as the P-value obtained has been 0.001 which is much less than 0.05, the level of significance set for this study.

Since, the F-ratio was found to be significant, the LSD post-hoc test was done, to find out whether there existed significant differences among the adjusted post-test means or not on the variable Dynamic Balance and the details are presented in Table 2.

**Table 2:** LSD Post-Hoc Test Done On the Two Groups for Difference between Adjusted Post-Test Paired Means on Dynamic Balance

Adjusted Post-test means		Mean Difference	Std. Error	P-value
Control group	Experimental group			
44.97	49.33	4.36*	0.851	<i>P</i> < .000**

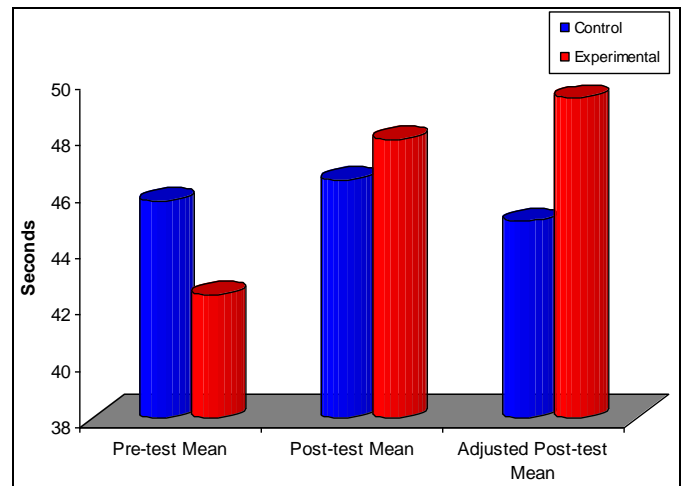
\* The mean difference is significant at 0.05 level

\*\* Based on estimated marginal means.

Adjustment for multiple comparisons least significant difference (equivalent to no adjustment)

The above table do indicates a mean difference of 4.36 and a P-value of 0.000. This do clearly shows that, there existed significant differences in the adjusted post-hoc paired means among the control group and experimental group. The

graphical representation of the adjusted post-hoc means of the two groups are presented in Figure 1



**Fig 1:** Graphical Representation of the Pre-test, Post-test and Adjusted Post-test Means on Dynamic Balance of the two different groups

**Conclusion**

The result of the study indicates that, there was significant difference on Dynamic Balance among the control group and the experimental group since, there was significant training effect on Dynamic Balance of the subjects of the experimental group after the plyometric training programme.

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