

## Assessment of Long Term Training Program Effects on Flexibility and Leg Strength of Women Field Hockey Players

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### Abstract

The purpose of the study was to assess the effect of long term training( one year plan) on flexibility and leg strength on women's field hockey players enrolled under Madhya Pradesh state women's hockey academy, Gwalior. The study involved 30 female field hockey players and age level ranged from 16 to 21 years. These hockey players had represented various national and international tournaments. Flexibility and leg strength were selected as a variable. One year long term training program was adopted and data were collected in different phase of training. The collected data was statistically analyzed by using ANOVA (F-ratio) and level of significance was 0.05. The analysis exhibits that both flexibility and leg strength were found significant among the group. The calculated F- ratio of flexibility (10.20\*) and leg strength (8.37\*) was significant at 0.05 levels. On the basis of the statistical analysis of data the maximum mean difference can be seen at pre-preparatory mean and post transitional mean (1.75). The highest mean of flexibility was observed post transitional phase of training (8.73), whereas the lowest was observed in pre preparatory phase (6.98). The lowest significant paired mean difference was recorded between the pre-preparatory and 1<sup>st</sup> intermediate of preparatory (0.58).on the other hand, the leg strength maximum mean difference can be seen at pre-preparatory mean and post transitional mean (16.83). The highest mean of leg strength was observed post transitional phase of training (74.23), whereas the lowest was observed in pre preparatory phase (57.40). The lowest significant paired mean difference was recorded between the post of preparatory and post of competition (6.84).

**KEYWORDS:** Sit and Reach Test, Leg dynamometer and ANOVA (F-Ratio)

### Introduction:

Almost all the physical activities incorporate element of force, quickness, duration and range of motion. Exercise to overcome resistance is strength exercise; speed exercise maximizes quickness and high frequency. Athletes vary in their talent to perform certain exercise. The talent is mostly genetics. Inherited leg strength and flexibility play an important role in reaching high level of performance and are called dominated motor or bio motor abilities. Motor refers to movement, the prefix bio illustration the biological importance of the abilities. The current system for athlete development emphasizes winning and competition rather than maximizing period of accelerate adaptation to training and developing core field hockey skills. The long term hockey development is based on general finding that the greater the quality of players preparation, the greater the likelihood that players of all abilities will remain active throughout their lifetime and the greater the likelihood that the performance peak of those who pursue excellence will be higher and maintained over a longer period. Long term training promotion lifelong wellness for all field hockey participant and optional performance for the elite players. In

today's techno-scientific age, the world has completely changed in all aspect due to discovery and research. In the field of games and sports also, there has been a great change with the help of scientific coaching and training. The athletes are being trained on scientific guidelines with highly sophisticated means for better achievement in their concerned sports to enable the coaches to get optimum performance with minimum expenditure of energy and time. They are being exposed to the exercise and training method, which have got beneficial effect for achieving higher standard. Hockey is a team game which is very popular in country, but very less scientific work has been done in the field specially on women hockey players, research work is very important for advancement of game through which we can educate the coaches, physical education teachers and hockey players regarding the role and importance of scientific research in the field of women's hockey.

### **Material and Method:**

Total 30 Female hockey players who are enrolled under Madhya Pradesh State Hockey Women Hockey Academy (M.P.S.W.H.A) Governed by the Madhya Pradesh Government selected as a subject of the study. The training program continued for one year regularly which was divided into different phase's i.e. preparatory, competition and transitional phase. The distribution of load intensity, division of yearly training program, training means & method at various meso & micro cycle and per day duration of training. The age ranged from 16 to 21 years. The data were collected in different phase of training. On the basis of the available literature, reviewed articles and accordance with view of the professional educator the flexibility and leg strength selected as a variable of the study. The criterion measure for selected variable flexibility and leg strength, are as follow: 1. Flexibility was measured by Sit and Reach test and scored measured in inches. 2. Leg strength was measured by leg dynamometer and scored recorded nearest to kilogram. To find out the progressive changes throughout the training program. A one way analysis of variance (ANOVA) was applied with the help of L.S.D Post Hoc test. The level of significance was set at 0.05.

### **Results:**

The statistical analysis of data collected on thirty subjects belonging to different phase of training period (before and after) of one long term training plan of Madhya Pradesh State Women Hockey Academy. The data was examined by applying analysis of variance and the level of significance was set at 0.05. After analysis of variance to find out the paired mean difference LSD post hoc test applied between the mean of different phases of training .To test the hypothesis, the level of significance was set at 0.05. The result pertaining to the analysis of variance of selected variable presented from the Table 1 to 2 and graphical representation of mean comparison of selected variable presented in Figure 1 to 2

**Table – 1**  
**ANALYSIS OF VARIANCE OF DIFFERENCE OBSERVATION IN**  
**RELATION TO FLEXIBILITY**

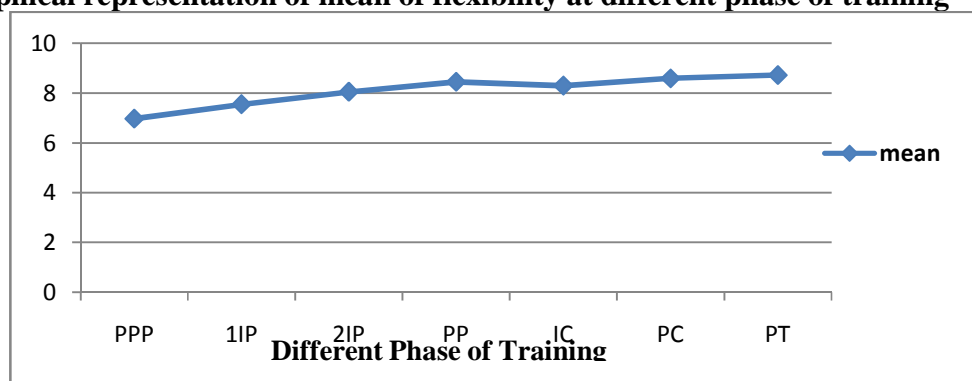
Source of variance	Sum of Squares	df	Mean Square	F
Between Groups	70.945	6	11.824	
Within Groups	235.250	203	1.159	<b>10.20*</b>
Total	306.195	209		

\*significant,  $F_{0.05}(6,203)=2.14$

It is revealed from Table 1 that the calculated value of F-ratio (10.20) in relation to flexibility is much higher than the tabulated F-value (2.14) at 0.05 level of significance. It shows that there is significant difference between mean of flexibility at different training phase from preparatory to transitional period.

**Figure -1**

**The graphical representation of mean of flexibility at different phase of training**



To find out the paired mean difference, the LSD Post Hoc test was used and revealed that there was significant difference between the paired mean of flexibility at different phase of training at pre-preparatory and 1<sup>ST</sup> intermediate of preparatory, pre preparatory and 2<sup>nd</sup> intermediate of preparatory, pre preparatory and post preparatory, pre preparatory and intermediate of competition, pre preparatory and post of competition, pre preparatory and post of transitional, 1<sup>st</sup> intermediate of preparatory and Intermediate of competition, 1<sup>st</sup> intermediate of preparatory and post of competition, 1<sup>st</sup> intermediate of preparatory and post of transitional, 2<sup>nd</sup> intermediate of preparatory and post of transitional is 0.58, 1.08, 1.48, 1.33, 1.62, 1.75, 0.75, 1.04, 1.17 and 0.67 respectively. The maximum mean difference can be seen at pre-preparatory mean and post transitional mean (1.75). The highest mean of flexibility was observed post transitional phase of training (8.73), whereas the lowest was observed in pre preparatory phase (6.98). The lowest significant paired mean difference was recorded between the pre-preparatory and 1<sup>st</sup> intermediate of preparatory (0.58).

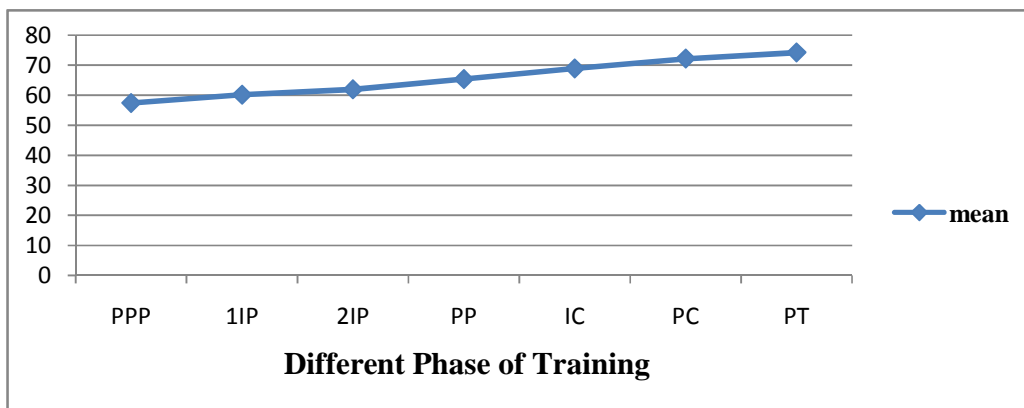
**Table -2**  
**ANALYSIS OF VARIANCE OF DIFFERENCE OBSERVATION IN**  
**RELATION TO LEG STRENGTH**

Source of variance	Sum of Squares	df	Mean Square	F
Between Groups	7173.048	6	1195.508	
Within Groups	28969.067	203	142.705	<b>8.37*</b>
Total	36142.114	209		

**\*significant,  $F_{0.05}(6,203) = 2.14$**

The above Table no.2 evident that the calculated value of F-ratio (8.377) in relation to leg strength is much higher than the tabulated F-value (2.14) at 0.05 level of significance. It shows that there is significant difference between mean of leg strength at different training phase from preparatory to transitional period.

**Figure 2**  
**Mean Comparison of Leg Strength at different phase of Training**



To find out the paired mean difference, L.S.D. Post Hoc test was administered and revealed that there is significance difference between the paired mean of leg strength at different phase of training at pre-preparatory and post preparatory, pre-preparatory and intermediate of competition, pre preparatory and post of competition, pre preparatory and post of transitional, 1<sup>ST</sup> intermediate of preparatory and intermediate of competition, 1<sup>ST</sup> intermediate of preparatory and post of competition, 1st intermediate of preparatory and post of transitional, 2<sup>nd</sup> intermediate preparatory and intermediate of competition, 2<sup>nd</sup> intermediate of preparatory and post of competition, 2<sup>nd</sup> intermediate of preparatory and post of transitional, post of preparatory and post of competition, post of preparatory and post of transitional is 7.96, 11.50, 14.80, 16.83, 8.74, 12.04, 14.07, 6.97, 10.27, 12.3, 6.84 and 8.87 respectively. The maximum mean difference can be seen at pre-preparatory mean and post transitional mean (16.83). The highest mean of leg strength was observed post transitional phase of training (74.23), whereas the lowest was observed in pre

preparatory phase (57.40). The lowest significant paired mean difference was recorded between the post of preparatory and post of competition (6.84).

#### **Discussion:**

On the basis of the statistical analysis and examination of data, it was revealed that there was a significant effect of long term training program on flexibility and leg strength. The finding of the study satisfied the objective and vary purpose of the on which the study was conceptualized. It was evident that leg strength showed significant improvement from preparatory to transitional, mainly in between preparatory phase and competition because they are engaged with various leg strength exercises for gaining good speed , agility etc. leg strength is a relative factor which is helpful for the development of speed and other physical component. The importance of strength training program is to be effective if it is executed in such a way. For any speed endurance game leg strength played prominent role for maintaining long duration of fitness. So we can say that leg strength is one of the very important demands for field hockey players and development of this component (leg strength) is adequately taken care of by the given long term training of the subjects of Madhya Pradesh State Women's Hockey Academy. Flexibility is one the demand of field Hockey on which various physical performances is based on. As we know that these girls are engaged with various training session and competition to maintain their physical standard, they were regularly doing stretching and flexibility exercises as part of their training program for better performance.

#### **Conclusion:**

The findings and result of the study highlight the long term training program and its effect on flexibility and leg strength. To pertain the long term (one year plan) pre, intermediate and post training data of every phase of training were collected. The training program continued for one year regularly which was divided into preparatory, competition and transitional phase. The findings of the study clearly indicate that there was significant effect of long term training on flexibility from pre-preparatory to post preparatory phase. Also showed that there was positive effect of training in other phase of training. On the other hand with reference to leg strength , it showed significant effect of training from preparatory to post transitional especially highest effect showed in post transitional phase.

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