**Abstract**

The purpose of the present study was to determine the differences in selected speed, acceleration and speed endurance due to the effect of hill running and step workout among footballers. To achieve the purpose of the study, 36 football players were selected from the Govt Hr Sec School, Thuvanarkurichy, Trichy District at randomly. The age of the subjects ranged from 16 - 18 years. The selected subjects were divided into three equal groups. Group I underwent hill running practice. Group II underwent step workout for three days per week over a period of twelve weeks. Group III acted as control group. Speed (50 mts run), Acceleration (30 mts run), Speed Endurance (150 mts run) was selected as dependent variables. The pre test and post test randomized control group design was used as experimental design. Pre test data was collected before the training programme and post-test was collected immediately after the training session. The collected data were statistically analyzed through analysis of covariance (ANCOVA). Whenever the F ratio for adjusted post test means was found to be significant, the Scheffe’s test was applied as post-hoc test to find out the paired mean difference was significant. In all the cases 0.05 level of confidence was fixed to test the hypothesis. The result of the study reveals that there was significant difference on selected dependent variables due to the effect of training among football players. The step workout practice was significantly effective in improving the speed and acceleration than hill training of football players and the hill practice was significantly effective in improving the speed endurance performance than step workout training of football players.

**Keywords**: step workout, speed, acceleration, speed endurance

**Introduction**

The player’s performance dependents on their effectiveness of training programmes, quality of surface, constructional characteristics and weather conditions. The playing characteristics are thought to be also determined by player movement, and player – surface interaction. Aside from providing possible injury protection to the runner, hill training is used by nearly all world-class athletes in their training. “Whether to build strength or to condition themselves for hilly races, most top runners use hills in their training.” Hal Higdon (1992, 151). Hill running has a strengthening effect as well as boosting your athlete’s power and is ideal for those athletes who depend on high running speeds - football, rugby, basketball, cricket players and even runners. In hill running, the athlete is using their body weight as a resistance to push against, so the driving muscles from which their leg power is derived have to work harder. The technique to aim for is a “bouncy” style where the athlete has a good knee lift and maximum range of movement in the ankle.

Activity is one of the fundamentals of weight loss. In other words, to lose pounds you have to move. Climbing stairs tones muscle and increases the heart rate. When you walk up stairs, you work multiple muscle groups to get the most out of your exercise routine. Utilizing stairs for exercise is also cost effective. Climbing stairs uses your body weight for resistance to work the large muscle groups in the lower body, including hips, thighs, calves, hamstrings and gluteus. Stairs provide an unusual but effective opportunity for exercise. Athletes and sportsmen often use stadium stairs for workouts.

Football refers to a number of sports that involve, to varying degrees, kicking a ball with the foot to score a goal. Football is a game where the technique requires running ability, both for offensive and for defensive strategies; passing or and kicking respectively.

**Statement of the problem**

The aim of the present study was to determine the significant improvement and differences on selected physical fitness characteristics such as Speed, Acceleration and Speed Endurance due to the effect of step work out and hill running among footballers.

**Methodology**

**Selection of subjects**

To achieve the purpose of the study, 36 football players were selected from the Govt Hr Sec School, Thuvanarkurichy, Trichy District at randomly. The age of the subjects ranged from 16 - 18 years. The selected subjects were divided into three equal groups. Group I underwent hill running, Group II underwent steps workout for three days per week over a period of twelve weeks. Group III acted as control group.

**Selection of variables and tests**

The following variables were selected for this study such as,

- Speed (50 mts run),
- Acceleration (30 mts run),
- Speed Endurance (150 mts run)
- Statistical design

The pre test and post test randomized control group design was used as experimental design in which 36 men football players were divided into three groups of twelve each on random basis. No attempt was made to divide the groups in any manner. Subjects are selected based on their interest; selected subjects were clearly instructed about the research by the researcher. Pre test data was collected before the training programme and post-test was collected immediately after the training session.

**Statistical analysis**

The collected data were statistically analyzed through anal-
Analysis of Data

Computation of Analysis of covariance of Speed

<table>
<thead>
<tr>
<th>Variables</th>
<th>Source of Variance</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F - Ratio</th>
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<tbody>
<tr>
<td>Speed</td>
<td>Hill running group</td>
<td>6.88</td>
<td>3</td>
<td>2.29</td>
<td>3.29*</td>
</tr>
<tr>
<td></td>
<td>Step workout group</td>
<td>6.67</td>
<td>3</td>
<td>2.22</td>
<td>3.29*</td>
</tr>
<tr>
<td></td>
<td>Control Group</td>
<td>7.44</td>
<td>3</td>
<td>2.47</td>
<td>3.29*</td>
</tr>
</tbody>
</table>

*Significant at .05 level of confidence.

Table I shows that the adjusted post test means on speed performance of Football players were greater than the confidence interval value of 0.05.

Scheffe’s Paired Mean Difference of Experimental and Control Groups on Speed

<table>
<thead>
<tr>
<th>Variables</th>
<th>Source of Variance</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F - Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steps</td>
<td>Hill training group</td>
<td>6.88</td>
<td>3</td>
<td>2.29</td>
<td>3.29*</td>
</tr>
<tr>
<td></td>
<td>Steps workout group</td>
<td>6.67</td>
<td>3</td>
<td>2.22</td>
<td>3.29*</td>
</tr>
<tr>
<td></td>
<td>Control Group</td>
<td>7.44</td>
<td>3</td>
<td>2.47</td>
<td>3.29*</td>
</tr>
</tbody>
</table>

*Significant at .05 level of confidence.

Table II shows that the paired mean differences of speed between hill running and step workout groups, hill running and control groups, step workout and control groups were 0.21, 0.56, and 0.77 respectively. These values are greater than the confidence interval value of 0.21.

While considering the two groups, from the results presented in table – IV it was found that step workout group was better than hill running group on speed.

Table III shows that the adjusted post test means on acceleration of hill running, step workout and control groups were 4.78, 6.67 and 7.44 respectively. The obtained \( F \) ratio of resting pulse rate 50.22* which was greater than the required table value of 3.29 for significance at 0.05 level of confidence with degrees of freedom 2 and 32. The results of the study indicate that there was significant difference between the adjusted post test means of experimental groups I & II and control group on acceleration performance of Football players.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Source of Variance</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F - Ratio</th>
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</thead>
<tbody>
<tr>
<td>Acceleration</td>
<td>Hill training group</td>
<td>4.78</td>
<td>3</td>
<td>1.59</td>
<td>27.03*</td>
</tr>
<tr>
<td></td>
<td>Step workout group</td>
<td>4.61</td>
<td>3</td>
<td>1.53</td>
<td>27.03*</td>
</tr>
<tr>
<td></td>
<td>Control Group</td>
<td>5.05</td>
<td>3</td>
<td>1.67</td>
<td>27.03*</td>
</tr>
</tbody>
</table>

*Significant at .05 level of confidence.

Table VI shows that the adjusted post test means on acceleration performance of Football players were greater than the confidence interval value of 0.15.

While considering the two groups, from the results presented in table – V it was found that step workout group was better than hill running group on acceleration.
Table VI shows that the paired mean differences on speed endurance between hill running and step workout groups, hill running and control groups, step workout and control groups are 0.85, 1.84 and 0.99 respectively. These values are greater than the confidence interval value of 0.65. The result of the study shows that there were significant differences between hill running and step workout groups, hill running and control groups, step workout and control groups since the mean differences were greater than the confidence interval value of 0.65.

While considering the two groups, from the results presented in Table VI it was found that hill running group was better than step workout group on speed endurance.

Findings

The following findings were obtained from the results of the Scheffe’s Paired Mean Differences of Experimental and Control Groups on dependent variables.

While considering the two training groups, from the results presented in the Scheffe’s Paired Mean Difference tables it was found that step workout group were significantly improved on speed and acceleration than compared to hill training group.

While compare the speed endurance between two training groups hill running group was better improved than step workout group.

Conclusions

From the analysis of the results, the following conclusions were drawn.

There was significant improvement on speed, acceleration and speed endurance of Football players due to the effect of hill running and step workout.

The step workout was significantly effective in improving the speed and acceleration than hill running group of football players.

The hill running was significantly effective in improving the speed endurance performance than step workout of football players.

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While compare the speed endurance between two training groups hill running group was better improved than step workout group.

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REFERENCES