The Effects of Hill Training To Improve the Speed of Under 17 Yr. Male and Female Athletics

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INTRODUCTION

Speed items commonly known as sprinting events have been on the agenda of the modern Olympic Games from the very beginning. Speed plays a vital role in all games and sports but it plays a very dominant role especially for the sprinters. For a sprinter to give good performance he must possess acceleration speed, sprinting speed, speed of movement and reaction time (Arlet, 1975). Earlier athletics did not adopt any sophisticated training means for the development of speed. In the competition the athlete exhibited whatever he gained through daily physical work and whatever speed characteristics he inherited from his parents. In ancient days the saying “Sprinters are never made they are born” used to carry might which is now being modified as sprinter in born with some inherited speed, but he can be shaped in to a better running skill as a result of scientific training (Arlet, 1975).

Each sprinter has individual speed dynamics shown in different combinations of stride frequency and stride length, acceleration capacity, ability to relax etc. These individualities depend largely on genetic differences, as well as physical development and training levels of an athlete. There is no doubt regarding the contribution of acceleration speed, sprinting speed and speed of movement to bring about better performance on the part of sprinters. A thorough analysis shows that results in most of the sports events are achieved by quickly accelerating the body which means the speed per unit time is increased as far as possible. Acceleration is concerned with the attainment of maximum speed in the shortest possible time (Tabaschnic and Sultanor, 1980).

SELECTION OF SUBJECTS AND COLLECTION OF DATA

The random sampling technique was used to select the sample with predetermined criteria’s of the study. Based on the above sampling technique, criteria’s and parameters 50 participants (25 male and 25 female) was selected for the study and these participants were divided in to two groups the 25 experimental and the 25 control groups and they have to participate or engage in the eight weeks training program. Having this size of the study was based on the reason that practical activities with large size of population is too difficult to manage during exercise that was affect the quality of data. As a result this size (50 participants) of the sample was selected from the total population of 100 male and female under-17 athletics.

EXPERIMENTAL DESIGN

The experimental design with two groups (control and experimental groups). These experimental groups participated in the training program and the control groups did not participate in the training program. Pre- and post test will take to the experimental and control groups. The training will be there from April to June for eight weeks with the frequency of three days per week and the duration was for 40 minutes per session because of they are not beginners they have been two years training experience no need of to start from the basic running techniques so, it is possible to provide the training plan easily.

The study design layout

<table>
<thead>
<tr>
<th>Treatments</th>
<th>hill training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>3 days/week</td>
</tr>
<tr>
<td>Total duration</td>
<td>8 weeks</td>
</tr>
<tr>
<td>Duration/session</td>
<td>40 minutes</td>
</tr>
<tr>
<td>Intensity</td>
<td>85-95% HR\textsubscript{max}</td>
</tr>
<tr>
<td>Exercise days</td>
<td>Saturday (morning), Tuesday and Thursday (afternoon)</td>
</tr>
<tr>
<td>Time of training</td>
<td>Morning (6:20-7:00 a.m); Afternoon (4:30-5:10 P. m).</td>
</tr>
</tbody>
</table>

PROCEDURES OF DATA COLLECTION

Speed/velocity: the speed or velocity test of the participants was accomplished in athletics track. Every trainee was try to cover the 50 meter total
distance from the starting point and then the time taken to cover the distance for each athlete was recorded. The test course was consist 15 - 20m of an acceleration zone and a 30-meter timing zone. Novice athletes should use a 15-meter acceleration zone; while more accomplished athletes can use a fly zone of 20 to 25 meters (Derse et al., 1995).

![Acceleration zone](image)

The 30-meter fly test evaluates the maximum velocity capacity of the athlete. The athlete was instructed to sprint through the acceleration zone and the 30-meter action/time zone with maximum effort. He or she was timed, however, only from the start of the 30-meter time or test zone to its finish. When the distance run (30 meters) was divided by the time recorded, the answer reveals the maximum velocity of the athlete in terms of meters-per-second (the number of meters traveled in one second, while sprinting at full speed). To date, the world’s fastest men and women have posted top marks of 12 and 10 meters-per-second respectively. Developing athletes will register values close to 10 meters-per-second for boys and 8 meters-per-second for girls (Derse et al., 1995).

RESULTS AND DISCUSSION

To investigate the effect of hill training to improve the sprinters speed among the under-17 athletics project trainees. The hill training program was provided for two months with the frequency of 3days/week for 40 minutes per session. The selected physical fitness variables were measured two times: before or pre training test and after or post training test and the trainees were divided in to control and experimental groups randomly. The variables which were measuring for the study were such as speed. The data was analyzed through paired t-test. The results for each variable are discussed as follow:

Table A

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>group</th>
<th>PT</th>
<th>PoT</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>control</td>
<td>5.98 ± 0.09</td>
<td>6.13 ± 0.16</td>
<td>0.03*</td>
</tr>
<tr>
<td></td>
<td>experimental</td>
<td>6.00 ± 0.12</td>
<td>6.22 ± 0.15</td>
<td>0.02*</td>
</tr>
</tbody>
</table>

PT = Pre-training Test; PoT = Post training Test, p < .05 * = Significant and the data in the form of Mean ± SD (standard deviation).

The data showed that there was significantly improvement in performance on speed, among the under-17 female trainees. The experimental groups showed the enhancement in performance. The rationale behind the improvement in performance was due to the well programmed and organized training which was conducted for two months. But the main purpose of this study was to investigate and compare the effect of hill training program on specific variables of speed, between the experimental (these who were done their training on hill) and control (these who were perform their training on track or ground) groups.

Table B

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>group</th>
<th>PT</th>
<th>PoT</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>Control</td>
<td>6.19 ± 0.39</td>
<td>6.31 ± 0.45</td>
<td>0.00*</td>
</tr>
<tr>
<td></td>
<td>experimental</td>
<td>6.61 ± 0.37</td>
<td>6.94 ± 0.38</td>
<td>0.01*</td>
</tr>
</tbody>
</table>

PT = Pre-Test and PoT = Post Test, p < .05 * = Significant and the data in the form of Mean ±SD
Table B showed that the Mean ± SD results of speed, among the male experimental and control groups. The pre and post training test mean values for speed was 6.19 m/s and 6.31 m/s, of these control groups and 6.61 m/s and 6.94 m/s of these experimental groups. This showed that before and after the delivery of two months training there was a significant difference in the speed of these male under – 17 athletes project trainees same as the females. Therefore, the mean difference for this speed was 0.12 m/s and 0.33 m/s of these control and experimental groups respectively. Experimental groups showed 0.21 m/s greater speed than these control groups.

Table C the female paired differences of both the control and experimental groups

<table>
<thead>
<tr>
<th>Dependant variables</th>
<th>Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed (m/s)</td>
<td>Control group</td>
</tr>
<tr>
<td></td>
<td>0.15 m/s</td>
</tr>
</tbody>
</table>

Table C showed that there was significantly an improvement in speed, that we have test among the female experimental groups than the female control groups does. So this increment in speed, tells us the biomechanical effect of hill training has dominantly affect these variables because the groups which were done their training on hill (the female experimental groups) shows absolute change in the different variables provided than the athletes there was performing their training on the track (the female control groups).

Table D the male paired differences of both the control and experimental groups

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Speed (m/s)</td>
<td>Control group</td>
</tr>
<tr>
<td></td>
<td>0.12 m/s</td>
</tr>
</tbody>
</table>

Table D showed that there was significantly an improvement in speed, that we have test among the male experimental groups than the male control groups does. So, both of these tables showed that male and females experience a better performance enhancement on the variables of speed, than the control groups. So, this showed that 95% Confidence Interval of the Difference. This is due to the biomechanical hill training effects on the sprinters speed among the u- 17 trainees.

This study assessed and tried to investigate the biomechanical effects of hill training to improve the sprinters speed, among under 17 trainees. Major findings of this investigation were the increment or the improvement of speed,. For this study the ways of measuring each performance tests were; try to cover the 50 meter total distance from the starting point by applying their maximum (95-100%) heart rate/speed was used to measure the speed/velocity and then the time taken to cover the distance for each athlete was recorded; The analysis of data were done through paired t-test to see the difference if any. The level of significance was set at 0.05.

As the tests result indicated that there was progressive improvement in performance from pre-test to post test due to the uphill training program. The tests results showed that statistically significance enhancement observed in the participants' speed.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

To find out the effect of hill training on speed ; The research was conducted on fifty ; male and female under – 17 athletics trainees’ aged 15-16 years old All subjects under study took part in an organized training program; these experimental groups were exposed to hill training program from April 25 to June 25/ 2016 with appropriate intensity, duration, and type of exercise and load of exercise.

This study assessed and tried to investigate the biomechanical effects of hill training to improve the sprinters speed, among under 17 trainees. Major findings of this investigation were the increment or the improvement of speed,. For this study the ways of measuring each performance tests were; try to cover the 50 meter total distance from the starting point by applying their maximum (95-100%) heart rate/speed was used to measure the speed/velocity and then the time taken to cover the distance for each athlete was recorded; The analysis of data were done through paired t-test to see the difference if any. The level of significance was set at 0.05.

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Conclusions

Based on the major findings of the study, these points were stated as conclusion:
• Hill training programs or exercises contribute to the improvement of speed, among the under 17 trainees. As a result this study found that there was progressive improvement in the speed, after two months training periods.

• Therefore, sprinters those participating in hill training (the experimental groups) were more advantageous in speed,. So females shows improvement in performance by 0.07m/s, 0.04m/s\(^2\) and 0.5strides/second of their speed, respectively greater than those who were engaged in track or flat surfaces. And also males shows good performance in speed =0.21m/s, greater than the control groups.

Recommendations
Based on the results of study, these recommendations are made:

1. Coaches should include hill training program in their training plan in order to improve the sprinters speed, by applying additional resistance and biomechanical running techniques.

2. Hill training forces the sprinters to run with resistant so this was important to decreased stride length had valuable change to stride frequency and increased muscular force output, especially at the hip, knee, and ankle and increase the speed & acceleration as well. This indicates a high level of fast force production in top sprinters and reaffirms the importance of strength during the acceleration phase of sprinting which, one can get through resisted speed training or hill training.

3. Coaches and athletes want to know the best modalities of resisted speed training and how they compare to each other, more importantly how they compare to overall speed improvement. The reason kinematics is still important is because again an athlete’s speed is only as good as their technique. It is great to know from all this research what is happening biomechanically or muscually but, the important outcome to all is which will help make you faster in the shortest amount of time.

4. REFERENCES