Effect of Resistance Training On the Improvement of Speed of Under-17 Male Sprinters

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Abstract: This study attempted to explore effects of resistance training on the improvement of speed of under-17 male sprinters of Indian high school Dubai. Purposive sampling technique was used to select 16 male athletes of age 15 to 16 years old. The main objective of the study was to investigate the effect of resistance training on the improvement of speed of under-17 male athletes of Indian high school Dubai. All subjects under this study took part in experimental design pre, during and post test without control group, 3 days per week for 3 months and 60 minutes per session. The resistance training for the study were: interval training, acceleration speed, weight training, squat training, ladder exercises, strength speed, uphill training, resistance run, speed strength, ABC training, polymeric training and circuit training. Data were analyzed by using SPSS paired samples t-test with pair wise comparison of means at 95% confidence interval by using pre, during and post tests. The results indicated that there were significant improvements in speed due to resistance training and physical fitness variables due to the effects of resistance training with active rest (p < 0.05). This study confirmed that resistance training with active rest was significant to improve the speed of short distance runners. The mean difference (MD) between pre and post tests for: 30meter flying speed was 0.36 micro seconds or before the training their mean values were found in the below average according to the standard and after the training they were included in the above average scale due to the strength training. Due to resistance training athletes also achieved both health related physical fitness and skill related physical fitness variables.

INTRODUCTION
Strength training is synonymous with the term ‘resistance training’ and is defined as a specialized form of conditioning that is used to increase one’s ability to produce or resist force. Strength training uses the principle of progressive overload to force the body (muscles, bones, tendons, etc.) to adapt in order to be able to produce and/ or resist larger forces. Strength training is a tool that can augment sport performance through improved strength and motor control. Resistance training helps to improve motor control and strength by “teaching” muscles how to work together in a coordinated manner (Savannah, 1999).

There can't be a single best exercise for everyone because different training that has different effects and the type of strength that one person needs to improve his or her speed and jumping ability may be the opposite of what another needs. Speed and jumping ability both require an athlete to display large amounts of power. Power is a combination of strength and speed. That means Power = Strength x Speed (Babić et al., 2007).

When performing a sprint, think of power as the amount of force that applies into the ground with each stride. Obviously the greater the force, the more ground going to cover with each stride. This Stride length is then combined with stride frequency or the speed at which cycle the legs when spring to determine running speed. So, it can increase speed by either increasing stride length or increasing stride frequency with the largest potential increases coming from an increase in stride length, where power is of at most importance (Knuttgen, H. G. 2003). This is influenced by the following strength qualities; Limit Strength: is the amount of force can apply irrespective of time. Limit strength can also be thought of as the strength of muscles when speed of movement is of little consequence. (Delecluse, 1997. The sprint is the fastest event of all events in athletics. The distances 100m, 200m, 400m and relay events are all regarded as sprinting events. The objective is to run the distance from start to finish as fast as possible. (Basic Coaching Manual - I.A.A.F., 2000). The sprint is the fastest event of all events in athletics. The distances 100m, 200m, 400m and relay events are all regarded as sprinting events (Frank, 2000).

Resistance Training Interventions
Muscle strength and power are modifiable risk factors for falls in older adults. Further, it has been demonstrated that resistance training can reduce the consequences of sarcopenia by improving muscle strength and power, body composition and physical function (Hanson et al., 2009). Traditionally,
strength training has been the method used to target sarcopenia. Hanson and colleagues (Hanson et al., 2009) completed a 22 week strength training program in 81 adults aged 65 to 85 to evaluate the effect on strength, power, body composition, and physical function. Participants were randomized to the strength training intervention or control group.

**PROCEDURE AND METHODS OF STUDY**

**Source of Data**

The researcher was used primary source of data by taking pre, during and post tests on the field by measuring times on 30m flying distance in (second) to know their sprinting performance levels at the beginning, in the middle and at the end of the program. The researcher was also use secondary data from different documents; like books and internet to support the study.

**Research Design**

The study was focused on experimental study for 12 weeks (3 months) of selected strength exercise and examined the athletes’ sprinting performance or ability. In this study there were sixteen (16) athletes from total population of thirty (30) athletes both males and females without controlled group. The researcher took pre-test at the beginning, during training test in the middle of the training and post test at the end of the program. The practices were continued for 12 weeks (3 months) three days per a week (3days/week) for 60 minutes per session (60min/session). The test had been taken in Indian school Dubai stadium athletics track and the researcher used 30m distance to measure their flying speed time in second.

Table 1 the study design layout

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Activities in the training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total duration</td>
<td>12 weeks(3 months)</td>
</tr>
<tr>
<td>Frequency</td>
<td>3 days/week</td>
</tr>
<tr>
<td>Duration/session</td>
<td>60 minutes/session</td>
</tr>
</tbody>
</table>

**Procedures Of Data Collection**

Data were collected by measuring the speed of the athletes on flying 30m distance in second and recorded on the score sheet, then in the middle during test were collected in the same way and finally their post-training tests were collected and differences would be identified. The researcher was collected data by taking pre-test, during test and post test at the end of 12 weeks of continued selected strength training.

**RESULTS AND DISCUSSIONS**

The study was tried to investigate effects of selected strength exercises on the improvement of speed of u-17 male sprinters of Dire Indian school Dubai. The researcher selected some resistance training exercise and provided for the subjects for 12 weeks (3 months). The training was given three days per week (3days/week) for 60 minutes per session (60min/session) in the morning session only from 12:00-1:00 AM local time. The speed of the athletes totally measured three times throughout the programs. That means pre training test, during training test and post training test were collected in the same ways on 30 meters flying speed, which is 40 meters distance, was measured and athletes started on 40 meters, however their time was taken after they ran 10 meters and their times on 30 meters flight taken. After data were collected in such away the researcher was analyzed data by paired t-test. The results of the study was discussed as follow

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>PT</th>
<th>DT</th>
<th>PoT</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed (m/s) in second</td>
<td>4.55±.16</td>
<td>4.32±.28</td>
<td>4.19±.29</td>
<td>0.00*</td>
</tr>
</tbody>
</table>

PT = pre test, DT = during test, PoT = post test, sign = significance and the data is in the form of mean and standard deviation (mean±sd)

As the data (table 2) shows there were a significant improvement on the speed of the athletes as a result of resistance training exercise of 12 weeks of continuous training programs.
The pre, during and post training tests mean value for 30 meters flight speed were 4.55 second, 4.32 second and 4.19 seconds respectively. These results indicate that there were progressive increase in speed of the athletes or decrease in their times. This shows that the resistance training exercise have significant importance on the improvement of speed of the athletes. The performance of the athletes before the training in average were 4.55 seconds, that means the athletes were below the average, (according to the standard) their speed performance during the training test (after 45 days) was 4.32 seconds in average which indicates there were improvements in their speed performance and they scored average score (according to the standard) and their post training test was 4.19 seconds in average it also shows that there is improvements in their speed again and now the final result shown the athletes scored above average scores.

Figure 1 shows the speed of the athletes has developed from pre test to post test progressively due to 12 weeks of resistance training programs.

Table 3 Mean difference in number and percentage

<table>
<thead>
<tr>
<th>DV</th>
<th>D/C</th>
<th>M D M S</th>
<th>M P (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT-DT</td>
<td>4.55-4.32</td>
<td>0.23</td>
<td>5.05</td>
</tr>
<tr>
<td>DT-PoT</td>
<td>4.32-4.19</td>
<td>0.13</td>
<td>3.01</td>
</tr>
<tr>
<td>PT-PoT</td>
<td>4.55-4.19</td>
<td>0.36</td>
<td>8.59</td>
</tr>
</tbody>
</table>

DV- Dependent Variable, D/C- Difference, MDM S- Mean Difference in Microsecond, MDP- Mean in Percentage

The above table shows the difference that the athletes gained due to twelve (12) weeks of resistance training exercise. In the table the first result shows the difference between pre test and during test. The result is 23 microsecond and it is the improvement the athletes achieved in the first 45 days of training. In this stage the athletes scored 4.32 second to cover 30meter flight which means according to the norm used for this research they improved their performance from below average to average score and after 45 days of strength training post test was taken and the result shows some improvement from during test that means the athletes improved their performance by 13 microseconds. This time the athletes improved their time by 13 microseconds and again they shifted from average score to above average score which means totally the athletes’ performance improved by 36 microseconds. Their improvement also calculated in percentage and it shows 5.05 percent and in the second phase they improved the performance by 3.01 percent and totally the improvement is 8.59 percent.

Figure 1 mean difference value of 30meter flying speed in second
Summary Conclusions and Recommendations

Summary
This research was conducted on sixteen (16) under-17 male athletes from Indian high school Dubai aged 15-16 years old. All subjects under study took part in experimental design before and after training tests without control group from November to January in 2015. This study assessed and tried to investigate effects of resistance training exercise on the improvement of speed of under-17 male athletes of Indian high school Dubai. Major findings of this investigation were the increment or the improvement of speed and strength of the athletes. There are a lot of exercises that develop physical fitness of participants. For this study, 30m flying speed run was used to measure speed of athletes in second. 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 speed and strength of the athletes from pre-test to during and to post test due to the strength training programs. The tests results showed that statistically significance enhancement observed in the participants' performance related physical fitness level especially power (strength and speed). Strength training provides strenuous work entirely suited to an individual's specific needs, existing capacity and rate of adjustment to progressive vigorous exercises.

Conclusions
Based on the major findings of the study, these points were stated as conclusion:

- Remember, every athlete has the ability to increase his or her sprinting and accelerating capabilities. It simply needs to work hard and work smart. The resistance training exercise presented in this paper can provide athletes with a starting point for athlete training program. Even minor adjustments in posture and technique can make them better sprinter after just a training session. Finally, remember to warm-up sufficiently before doing a sprint training session. Gradually, build up to higher intensities throughout warm-up before going ‘all-out’ in the workout. A proper warm-up before competition will also contribute towards enhanced performances in field.
- Resistance training exercise contribute to the improvement of sport related physical fitness’s, like agility, power, speed, balance, co-ordination and reaction time as observed on the study while testing them on 30 meter flight distance of under 17 male athletes of Indian high school Dubai. This study found that there was progressive improvement in the speed of the athletes from pre to post training tests.
- Regular participation in resistance training exercise 3 days/week can improve the physical fitness of athletes. Therefore, a generally speaking regular participation in selected strength training improves the speed of short distance runners. In this study selected and scientific strength exercises was found better in improving the sprinting performance and strength of the athletes. It was also found that selected strength exercises have significances in improving the performance of the athletes on skill related physical fitness as well as health related physical fitness.
- Resistance training is one of the training methods in which a number of exercises are arranged to improve overall performances of the athletes in most sports’ physical fitness variables such as strength, power, agility and speed of the athletes. The involvement of strength training in the
athletes’ training program is a key to improve specific physical fitness variables.

**Recommendations**

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

In Indian high school Dubai specific and scientific resistance training exercise should be included in their training programs regularly in order to improve the speed of athletes’. Emphasis should be given to the specified and very important resistance training to develop the sport related physical fitness components of short distance runners and field event performers. According to the finding the selected and resistance training will bring the former results in the field of athletics in Indian high school Dubai. Every exercise session should be preceded by approximately five-ten minutes of a general warm-up, followed by several sport specific warm-up exercises performed at a light intensity. Each athlete should be physically and emotionally prepared to participate in a resistance training program.

Resistance training improve strength and coordination,

- increase muscle endurance
- improved sport performance
- increases bone density
- improves heath,
- improves bone strength/ bone density,
- reduces risk for injury,
- improves self-image and self-confidence.

Resistance training helps to improve motor control and strength by “teaching” muscles how to work together in a coordinated manner. Probably the best way to introduce athletes to the wonderful world of resistance training is to have them perform ‘body-weight’ exercises. As you might guess, these exercises use the athlete’s own body weight as the resistance.

The benefits of these exercises are several-fold. First, this type of exercise is inexpensive and easy to implement. Second, these exercises strengthen the muscles of the body that help to stabilize the body. It is important to develop a solid strength base in these muscles before progressing on to more advanced exercises.

**REFERENCES**


