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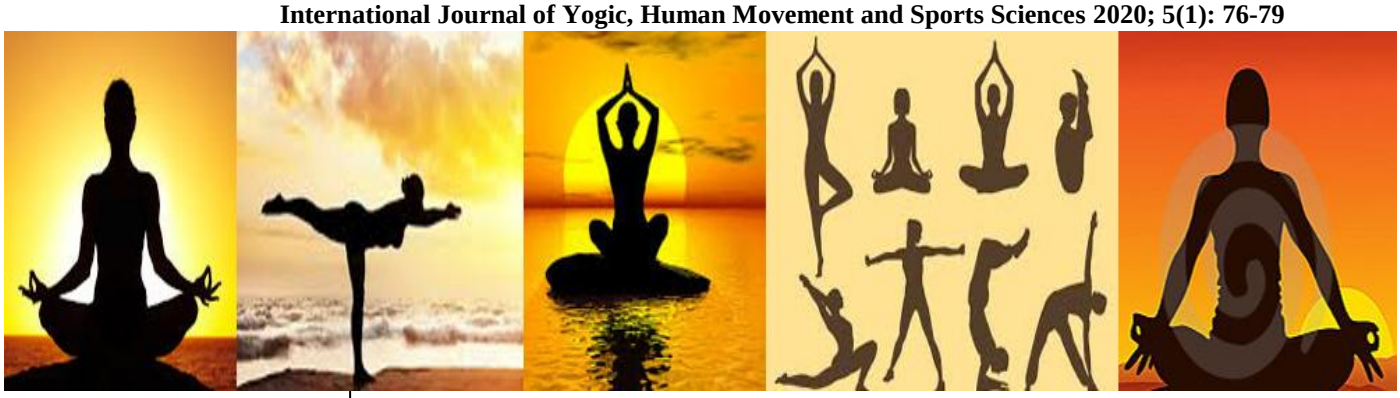

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**Dr. Abinet Ayalew**
(Phd), Haramaya University, Sport Academy, Department of Sport Science, Ethiopia

**Dr. Desta Enyew**
(Phd), Haramaya University, Sport Academy, Department of Sport Science, Ethiopia

**Yonas Meberat**
(Msc), Bonga University, College of Natural and Computational Sciences, Department of Sport Science, Ethiopia

**Corresponding Author:**
**Dr. Abinet Ayalew**
(Phd), Haramaya University, Sport Academy, Department of Sport Science, Ethiopia

# Effects of anaerobic exercise on some selected skill related physical fitness components

**Dr. Abinet Ayalew, Dr. Desta Enyew and Yonas Mebrat**

**Abstract**
The study was conducted to investigate the effect of anaerobic exercise on some selected skill related physical fitness component. The study design was quasi Experimental method. Simple random sampling technique were used to select subjects as well as to assign subjects for control and experimental groups, 40 male sample was taken from a population of 340 male students by lottery sampling technique, all subjects had divided randomly into 2 equal groups (n=20) control group (CG) and (n=20) experimental group (EG) was implemented. EG who performed in 3 days/week for 3-month anaerobic exercise training program like as speed bonding drills, agility drills and squats on the other hand a CG did not perform this selected anaerobic training unless both groups undergone normal physical education class program. Both groups had taken pre, during and post-testing. PT of two groups of 20 subjects power was measured by explosive leg power vertical jump test for power, speed was measured using 30m run test, and agility was measured Illinois agility test were recorded. After three months, posttest measurement on the same parameters was taken. The difference between the tests were analyzed statistically, with paired sample "t" test at $P<0.05$ to determine the difference between initial and final mean for participant. According to analyzed data. The mean difference value boosted in vertical jump performance by 4.8cm. In 30 meter run 0.36 second mean differences was recorded. After 12 weeks anaerobic exercise in Illinois agility test 1.5 second increments were observed throughout the study period. The result obtained in this study indicated that there were significant improvement in power, speed, and agility. Based on this finding, it can be concluded that anaerobic exercise has positive effect on improvement of selected skill related physical fitness components of male students.

**Keywords:** Anaerobic exercise, skill, physical fitness

## Introduction
Regular physical exercise enhance the function of the joints; increase the sense of physical well-being and promotes a sense of feeling good; increases physical working capacity by increasing speed, power, agility, reaction time, coordination and Balance. Physical Education is accepted as a "complete experience". "Physical fitness" is the biggest potentiality of human being. It can only be achieved through day to day physical activity (Cox *et al*., 1996) [7].
Skill related physical fitness refers to an individual's athletic ability in sports such as tennis and encompasses skill-related attributes like dynamic balance, power, speed and agility (Hopkins and Walker, 1988) [19]. However, physical education uses physical activity to produce holistic improvements in persons' physical, mental and emotional qualities Freeman. Physical activity has significant physical health benefits; and it appears to improve skill and health-related quality of life by enhancing psychological well-being and by improving physical functioning in persons compromised by poor health and is positively associated with health related quality of life (Hausenblas and Janells 2001) [18].
Physical fitness is a positive quality of life, extending on a scale from death to "abundant life". We living individuals have some degree of physical fitness which varies considerably in different people and in the same individuals at different times. Among the influencing factors the aim of the study want to evaluate the effect of anaerobic training on skill related physical fitness; Among the attributes of physical fitness, speed; agility; power; will belong under this study, skill Related Physical Fitness of grade 11 students.

## Methods

### 1. The Study Subjects and Research Design

The study design in this study was quasi experimental design that was examining the effect of, anaerobic exercise on selected skill related physical fitness components for grade 11 male students with the age of 16-19 at Abay Minch general secondary and preparatory school. As a result, in this study the researcher was apply to experimental (EG=20) Training programs planned for a period of 12 weeks and it was be 3 days a week and for 40 to 60 min each day and normal physical education class training program for control (CG=20) group. An exercise involving the use of large muscles groups that could be maintained continuously and are anaerobic in nature was included in the program.

These exercises included, running, squat, vertical jumping, Illinois Agility run, Speed bounding drill and stretching exercises. There is also practical class training program in the academic schedule of physical education at the school for the whole students one day per week.

**Table 1:** The Study Design Layout

| Treatment | Anaerobic Exercise program |
|---|---|
| Frequency | 3 days/week |
| Total duration | 3 month |
| Duration/Session | 40-60 respectively/a month |
| Intensity | Moderate (55-70) |
| Exercise days | Monday, Wednesday and Friday morning (10:30-11:30) |
| Time of Training | Morning |

### 2. Results and Discussion

### 2.1 Characteristics of study participants and physical fitness variables

**Table 2:** Characteristics of the study participants

| Group | N | Age | Height | | Weight | |
|---|---|---|---|---|---|---|
| | | Mean | S.D | Mean | S.D | Mean | S.D |
| EG | 20 | 18.35 | 0.75 | 1.66 | 0.018 | 55.50 | 4.63 |
| CG | 20 | 18.20 | 0.77 | 1.69 | 0.030 | 54.30 | 4.66 |

As shown from above Table 2 Descriptive characteristics of 40 study participants from Abay Minch preparatory school mean of age (EG=18.35, CG=18.20) height (EG=1.66, CG=1.69)

And weight (EG=55.50, CG= 54.30). Subjects were relatively had the same age, height and weight at the beginning of exercise.

**Table 3:** Dependent Variables and Tests

| No | Variables | Methods/Tests | Equipment | Unit of Measurement |
|---|---|---|---|---|
| 1 | Power | Explosive leg power (vertical jump test) | Measuring tape and marking powder | Centimeter |
| 2 | Speed | 30m run test | Sport field, Stopwatch, Whistle and cones | Second |
| 3 | Agility | Illinois' agility Test | Sport field, Stopwatch, Whistle and cones | Second |

As it can be seen in above table 3 illustrated that the types of variables, methods, test items and its measurement units which designed to do this experimental research. The results of selected physical fitness variables of experimental and control groups pre, during and post-test data were analyzed. Its results had showed under these tables.

### 2.2 Effects of Anaerobic Exercise on Power

**Table 4:** The mean values of power (explosive leg power vertical test) for EG and CG

| Group | Test | PT(X±SD) | DT(X±SD) | PoT(X±SD) | ΔX)PTand PoT | P-value |
|---|---|---|---|---|---|---|
| EG | Vertical jump test | 22.80±3.38 | 24.80±3.35 | 27.60±3.55 | 4.8 | .000 |
| CG | Vertical jump test | 23.85±2.62 | 23.35±2.56 | 23.90±2.36 | 0.04 | .900 |

*EG= experimental groups, CG=control group X=mean value of each tests, SD= Standard deviation, ΔX= (MD) mean difference, PT=pretest result, DT= during training result, PoT= post test results, p=significance level.*

As shown from table4 the average pretest score of EG (N=20) was found to be 22.80 with a standard deviation of 3.38 and CG (N=20) was found to be 23.85 with an SD of 2.62 from this data we can see that the scores in the pretest for both groups were close. After six weeks experimental mean score was 24.80 with SD 3.35 and control groups mean score of 23.35 with SD score 2.56. In contrast, the average post test score after 12 week anaerobic exercise training of experimental group was found out 27.60 with SD of 3.55 and for control groups mean 23.90 with SD of 2.36. From this data we can see that the scores in the posttest for both groups were very different. One can pick up that these numbers in pretest and posttest mean scores achievement levels are different. Hence, these data indicated that there is a significant difference and gradual improvement between PT, DT and PoT test results of EG and there is deficient improvement between PT, DT and PoT test results of CG.

### 2.3 Effect of Anaerobic Exercise on speed

**Table 5:** The mean values of 30 meter run test for EG and CG

| Group | Test | PT(X±SD) | DT(X±SD) | PoT(X±SD) | ΔX)PT and PoT | P-value |
|---|---|---|---|---|---|---|
| EG | 30 meter run | 5.33±0.26 | 5.24±0.25 | 4.97±0.30 | 0.36 | .000 |
| CG | 30 meter un | 5.31±0.31 | 5.33±0.41 | 5.25±0.29 | 0.05 | .007 |

*EG= experimental groups, CG=control group X=mean value of each tests, SD= Standard deviation, ΔX= (MD) mean difference, PT=pretest result, DT= during training result, PoT= post test results p=significance level.*

As shown from table 5 the average pretest score of EG (N=20) was found to be 5.33 with a SD of 0.26 and CG (N=20) was found to be 5.31 with an SD of 0.31 from this data we can see that the scores in the pretest for both groups were near.

After six weeks EG score was 5.24 with SD 0.25 and CG mean score of 5.33 with SD score 0.41. In contrast, the average post test score after 12 week anaerobic exercise training of EG was found out 4.97 with SD of 0.30 and for CG mean 5.25 with SD of 0.29 from this data we can see that

the scores in the posttest for both groups were very different. One can pick up that these numbers in pretest and posttest mean scores achievement levels are different. Hence, these data indicated that there is a significant difference and gradual improvement between PT, DT and PoT test results of EG and there is no sufficient improvement between PT, DT and PoT test results and there is no improvement between PT, DT and PoT test results of CG.

### 2.4 Effect of Anaerobic Exercise on Agility

**Table 6:** The mean values of agility test for EG and CG

| Group | Test | PT(X±SD) | DT(X±SD) | PoT (X±SD) | ΔX)PT and PoT | p-value |
|---|---|---|---|---|---|---|
| EG | Illinois agility run | 20.13±1.52 | 19.82±1.51 | 18.63±1.48 | 1.5 | 0.000 |
| CG | Illinois agility run | 20.76±1.20 | 20.60±1.37 | 20.74±1.55 | 0.02 | 0.931 |

*EG= experimental groups, CG=control group X=mean value of each tests, SD= Standard deviation, ΔX= (MD) mean difference, PT=pretest result, DT= during training result, PoT= post test results p=significance level.*

As shown from table 6 the average pretest score of EG (N=20) was found to be 20.13 with a SD of 1.52 and CG (N=20) was found to be 20.76 with an SD of 1.20. From this data we can see that the scores in the pretest for both groups were close.

After six weeks EG mean score was 19.82 with SD 1.51 and CG mean score of 20.60 with SD of 1.37 In contrast, the average post test score after 12 week anaerobic exercise training of EG was found out 18.63 with SD of 1.48 and for CG mean 20.74 with SD of 1.55. From this data we can see that the scores in the posttest for both groups were very different. One can pick up that these numbers in pretest and posttest mean scores achievement levels are different. Hence, these data indicated that there is a significant difference and improvement between PT, DT and PoT test results of EG and there is no improvement between PT, DT and PoT test results of CG.

### 2.5 Comparison of three tests (vertical jump, 30meter run, and Illinois agility) results of EG

**Table 7:** Changes of 12 week anaerobic exercise in the selected skill related physical fitness components (power, speed and agility)

| *Type of test* | *PT(X±SD)* | *DT(X±SD)* | *PoT(X±SD)* | *ΔX)PT AND POT* | *P-value* |
|---|---|---|---|---|---|
| Power (vertical jump) | 22.80±3.29 | 24.80±3.26 | 27.60±3.46 | 4.8 | 0.000 |
| Speed(30m run) | 5.33±0.26 | 5.24±0.24 | 4.97±0.29 | 0.36 | 0.000 |
| agility(Illinois' agility test) | 20.13±1.48 | 19.82±1.47 | 18.63±4.26 | 1.5 | 0.000 |

*X=mean value of each tests, SD= Standard deviation, ΔX= (MD) mean difference, PT=pretest result, DT= during training result, PoT= post test results p=significance level.*

The above table showed that EG there was significance difference in between the pre to post test score of (vertical jump test, 30 meter run test,

Illinois agility test) results due to twelve week anaerobic exercise in the selected skill related physical fitness components (power, speed and agility). All test had changes was due to Anaerobic exercises in which they were engaged in. the mean score value of power pretest before training result was (22.80) and posttest after training mean score values was (27.60) The mean difference score of pretest with mean difference score of posttest mean difference value increased by (4.8).

As indicated the tables mean value of speed from pretest 5.33 increased to 4.97 post test. Speed score of pretest to posttest mean difference value of EG increased 0.36 recorded. The mean value of agility from pretest 20.13 increased to 18.63 posttest result. Agility score of pretest mean to posttest mean difference value of EG increased 1.5 recorded.

When we compare the pretest and posttest of mean difference value score in each test of 12 weeks Anaerobic exercise intervention experimental groups. change observed on Power (vertical jump test), Speed (30 meter test) and Agility (Illinois agility test) The improvement rate of this data was one indicator of the great Anaerobic exercise training effect on some selected skill related physical fitness components. Therefore, anaerobic exercise training was important for increment of power, speed and agility according to the result on this study.

## Conclusions

Previous studies have found that anaerobic exercise is associated with improved skill related physical fitness among students at different age and sex levels. However, it remains unclear whether associations are present in both anaerobic exercise and skill related physical fitness particularly.

The purpose of this study was to evaluate the associations between anaerobic exercises with selected skill related physical fitness components in grade 11 students in case of west gojjam Zone sekela Wereda abay minch general secondary and preparatory school. Data was drawn from a pre and posttest after 12 weeks of anaerobic exercise training within selected physical fitness tests i.e. vertical jump to assess power, 30 meter run to assess speed, and Illinois agility test to assess agility administered to selected sample male subjects (N=40). As a result, the following conclusion was made. This study indicate that anaerobic exercise has its own advantage on improving students skill related physical fitness particularly power, speed, and agility on the anaerobic exercise experimental groups showed a significant difference ($p$<0.05) on the above components compared with control group.

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