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## A study on acceleration phase maximum speed and average speed of different age group of school girls

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### Abstract

The aim of this study was to find out the length of acceleration phase, maximum speed and average speed of different age group of girls' student during 50m run. Total 60 girls' students from 10 to 15 years were selected as subject for the present study. All the students were divided into three equal age groups i.e., 10-11yrs., 12-13yrs. and 14-15yrs girls group. The data was collected from 50m performance of the subject and the total distance was divided into 5 equal zones. The length of Acceleration Phase was extended (0-35m) for both girls groups i.e., 10-11 yrs. and 12-13 yrs. girls group but it was extended (0-25m) for 14-15yrs. girls group. The maximum speed of all three girls group i.e., 10-11 yrs., 12-13 yrs. & 14-15 yrs. girls were 6.01, 5.76 & 6.34 m/sec. and average speed were 5.48, 5.32 & 5.54 m/sec respectively. The schools going untrained girls have smaller acceleration zone and the length of acceleration zone decreased with increase of age. The maximum speed and average speed were increased with increase of age for 10-11 yrs. to 12-13 yrs. girls' students but it was decreased with increase of age for 12-13 yrs. to 14-15 yrs. girls' student.

**Keywords:** Acceleration phase, average speed, school girls

### Introduction

Speed ability should not be equated with mechanical speed which is equal to the distance covered per unit of time. In several sports actions no distance is covered at all. Speed ability primarily signifies the ability to execute motor movements with high speed. These movements may be cyclic or acyclic in nature. According to Barrow and Mc. Gee (1971), speed is defined as "One's ability to perform successive movement of the same pattern at a fast rate". Speed may also be defined as "rapidity with which a movement or successive movements of the same kind may be performed by an individual".

For the direct improvement of acceleration ability short sprint are best means. The distance or duration of these sprints is based on practical experience as well as on some research findings. Henry (1952) found that sprinters achieve their maximum speed in about 6 seconds after start. Farfel (1952), Zdanov (1956) and Furnadziev & Petkova (1977) also found that irrespective of the performance level and age the maximum speed is achieved in 5-6 sec. after start. They also found that during a sprint the increase in speed is as follows:

At the end of –

1 <sup>st</sup> Seconds	-	55%	2 <sup>nd</sup> Seconds	-	76%
3 <sup>rd</sup> Seconds	-	91%	4 <sup>th</sup> Seconds	-	95%
5 <sup>th</sup> Seconds	-	99%			

Gundlach (1969), Furnadziev & Petkova (1977) and Letzelter (1975 & 1978) found that distance over which maximum speed can be maintained as follows:-

- 1)12-13 year old children -15-20 m
- 3)14-16 year old children -20-30 m
- 2)12-13 year old trained children-20-30 m
- 4) Well trains adults -30 m longer

### Purpose of the Study

- 1) To find out the average length of acceleration phase of the particular subject according to their age group.
- 2) To find out the maximum speed and average speed during 50m run of girls students according to their age group.

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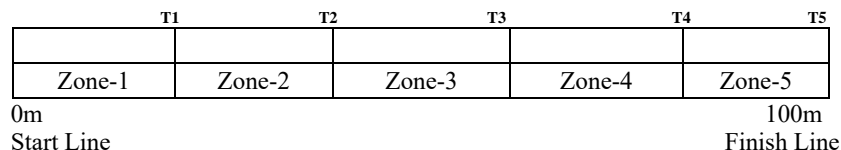
**Methodology**

**Subject**

Total 60 girls' students from 10 to 15 years were selected as the subject of this study. All the students were divided into three equal age groups. The age groups were 10-11 yrs., 12-13 yrs., and 14-15 yrs. girls. The each group was consists 20 girls subject. All the subjects were collect from same locality.

**Sources of data**

The data was collected from 50m sprint run and total distance was divided into 5 equal zones. In the end of every 10 m zone one time keeper was place. In the time of 50m run all the time keeper recorded the time from starting to the end of particular zone such as (start-10m), (start -20m), (start-30m), (start-40m) and (start-50m). The design of the data collecting method shown in fig.1



**Fig. 1:** Shows the method of collecting data

**Result and Discussion**

**Personal data:** Total 60 girls' subjects were selected for this study. Their personal data i.e., age, height and weight were

recorded. The mean and SD of age, height and weight of the subject were presented in table -1

**Table 1:** Mean and SD of age, height & weight of three groups.

Group (Girls)	Age (Years)		Height (C.M.)		Weight (Kg.)	
	Mean	SD	Mean	SD	Mean	SD
10-11 Yrs. Girls	10.94	0.56	140.35	6.91	27.35	3.52
12-13 Yrs. Girls	12.95	0.57	147.00	6.12	35.45	4.59
14-15 Yrs. Girls	14.98	0.54	151.70	7.73	38.65	6.58

Mean of age of three groups i.e. 10-11 Yrs. 12-13 Yrs. and 14-15 yrs. girls were 10.94, 12.95 & 14.98 and SD were 0.56, 0.57 & 0.54 respectively. The mean of height of three groups were 140.35, 147.00 & 151.70 and SD was 6.91, 6.12 & 7.73 respectively. The mean of weight of the three groups were 27.35, 35.45 & 38.65 respectively and SD was 3.52, 4.59 & 6.58 respectively.

**The Data:** The time of 50 m run zone wise of the subject of three groups were considered as the data of present study. In the same time Acceleration Phase, maximum speed and Average Speed of the subject was recorded during the 50m sprint run.

**Presentation of the Data:** From the time of 50m run zone wise average mean time taken of different zone was calculated. The mean time taken in different zone represent in the table-2

**Table 2:** Represents the Mean time taken in different zone.

Group	Average time taken in different zone (sec.)					
	0-10 m (Zone-1)	10-20m (Zone-2)	20-30m (Zone-3)	30-40m (Zone-4)	40-50m (Zone-5)	00-50m Total
10 -11Yrs. Girls	2.37	1.755	1.666	1.663	1.668	9.122
12-13 Yrs. Girls	2.36	1.795	1.757	1.735	1.747	9.394
14-15 Yrs. Girls	2.371	1.719	1.577	1.626	1.73	9.023

From the obtain mean time of different zone and distance the velocity of each subject ware calculated and mean velocities of different zone of 50m run were find out. The mean

velocities of different zone of 50m run for the three group were presented in table-3

**Table 3:** Represents the Mean scores of zonal velocities for 50 m run for three group.

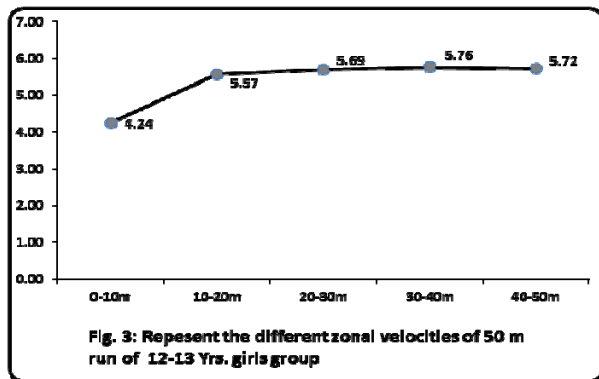
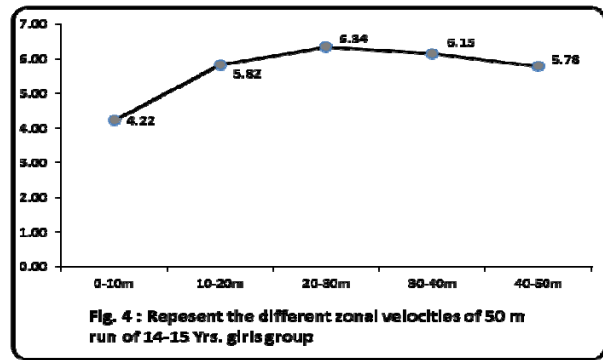
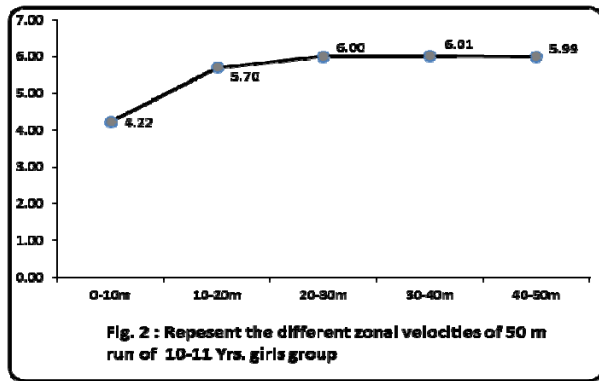
Group	Velocity (m/sec.)					
	0-10 m (Zone-1)	10-20m (Zone-2)	20-30m (Zone-3)	30-40m (Zone-4)	40-50m (Zone-5)	00-50m Total
10 -11Yrs. Girls	4.22	5.70	6.00	6.01	5.99	5.48
12-13 Yrs. Girls	4.24	5.57	5.69	5.76	5.72	5.32
14-15 Yrs. Girls	4.22	5.82	6.34	6.15	5.78	5.54

**Note:** Velocity = (10m/ mean time of particular zone)

The zonal velocity of 10-11 yrs., 12 -13 yrs. and 14-15 yrs. girls subject in zone 1 - 4.22, 4.24, 4.22, in zone -2 - 5.70, 5.57, 5.82, in zone 3- 6.00, 5.69, 6.34; in zone 4- 6.01, 5.76, 6.15 and in zone 5- 5.99, 5.72 & 5.78 respectively.

**Discussion of the study**

From table no.3: It was observed that acceleration zone was extended from (0-35m) for 10-11 yrs. & 12-13yrs. both girls group 12-13 yrs. and (0-15m) for 14-15 yrs. girls group. From this information distance-velocity curve of three girls group drawn in Fig. 2, Fig. 3 and Fig. 4.



From Fig.2 it was observed that acceleration zone was extended from (0-35m) for 10-11yrs. girls s group. It was also observed that the maximum speed of the subject was 6.01 m/sec and the average speed of the subject was 5.48 m/sec. From the fig.3 it was observed that acceleration zone was extended (0-35m) for 12-13 yrs. girls subject. It was also observed that the maximum speed of the subject was 5.76 m/sec. and average speed of the subject was 5.32 m/sec. From the fig.4 it was observed that acceleration zone was extended from (0-25m) for 14-15 yrs. girls. It was also observed that the maximum speed of the subject was 6.34 m/sec. and average speed of the subject was 5.54 m/sec. From these curves, length of acceleration zone, maximum speed and average speed was find out. Table no. 4 shows the results

**Table 4:** Length of acceleration zone, maximum speed and average speed for different age group of boys & girls.

Group (Girls)	Acceleration zone(m)	Maximum speed (m/sec)	Average speed (m/sec)
10-11 Yrs. Girls	0-35	6.01	5.48
12-13 Yrs. Girls	0-35	5.76	5.32
14-15 Yrs. Girls	0-25	6.34	5.54

It was observed that the acceleration zone was extended (0-35m) for both girls group i.e. 10-11yrs. & 12-13 yrs. girls but (0-25m) extended for 14-15yrs. girls group. The maximum speed obtained by 10-11yrs, 12-13yrs and 14-15yrs girls were 6.01, 5.76 and 6.34 m/sec and average speed of all three groups were 5.48, 5.32 and 5.54m/sec respectively. It was also observed that maximum speed of different age groups of girls decreased with increase of age 10-11 yrs. to 12-13 yrs. girls. The maximum speed of 10-11 yrs. girls was 6.01m/sec. but it was decreased for 12-13 yrs. girls group to 5.76m/sec. (4.16% decreased). Again it was observed that the maximum speed of different age group of girls increase with increase of age 12-13 yrs. to 14-15 yrs. girls. The maximum speed 12-13 yrs. girls was 5.76m/sec., but it was increase for 14-15 yrs. girls group 6.34m/sec (9.15% increased).

**Conclusion:** On the basis of the result of the present investigation for 10-15 yrs. untrained school going girls students with the existing limitation of the study following conclusions were drawn:

- 1) The untrained 10-15yrs. school going girls have smaller acceleration zone. The acceleration zones were extended (0-35m) for 10-11yrs. & 12-13yrs. girls but it was extended (0-25m) for 14-15yrs. girls group.
- 2) The maximum speed of different age group of girls were 6.01, 5.76 & 6.34m/sec. The maximum speed of 10-11 yrs. to 12-13 yrs. girls 4.16% decreased with increase of age. Again the maximum speed of 12-13 yrs. to 14-15 yrs. girls 9.15% increased with increased with age.
- 3) The average speed of different age group were girls were 5.48, 5.32 & 5.54 m/sec. respectively.

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