



Volume: 2, Issue: 5, 257-259  
April 2015  
www.allsubjectjournal.com  
e-ISSN: 2349-4182  
p-ISSN: 2349-5979  
Impact Factor: 3.762

**Deepak**  
Research Scholar, AUUP,  
Uttar Pradesh, India

**Dr. Inder Singh Pal**  
Asst. Prof., AUUP, Uttar  
Pradesh, India

## Comparison of distance-time, distance-speed and distance-acceleration curves of university level sprinters with an elite sprinter

**Deepak, Dr. Inder Singh Pal**

### Abstract

The purpose of the study was to compare distance-time of university level sprinters with an elite sprinter as well as to compare distance-speed and distance-acceleration curves of university level sprinters with an elite sprinter. Five university level sprinters selected from Amity University, Noida. For selecting the subjects the scholar conducted a test and the best five male sprinters whose 100m performance was 11.5 seconds and better were selected as subjects for the purpose of the study. The criterion measure chosen for the present study was the 100m performance recorded nearest to one-hundredth of a second. Single Group Experimental Design was used in the study, the performance of each Amity University sprinters was separately compared to that of the international level sprinter (Usain Bolt). The study indicated that the time action period in sprint performance over 100mts these are to be trained for better performance in sprint Reaction speed, Block Clearing Speed, Acceleration speed, maintenance speed and Finish Speed.

**Keywords:** Block Clearance, Distance time, Distance speed, Distance acceleration Curve

### 1. Introduction

Sprints are defined as all the races in which the contestant runs at full speed over the entire distance on the flat. The best style in sprinting follows the laws of human motion based on certain accepted mechanical principles. The effectiveness of this forceful thrust is manifested by the fact that one sprinter achieves a faster time than his opponent over the same racing distance. In sprint running mainly in 100-400m run, a fraction of second is vital which can change the fate of the athlete. The velocity of propulsion depends mainly on the intensity and direction of the push off force. Speed of a person depends upon two main factors namely stride frequency and stride length, between them stride frequency is mostly inherited in nature. It would therefore appear sensible to define speed on a section yet to be determined as the phase of maximum speed. The most striking difference between speed curves of experienced and less experienced runners in that acceleration in the starting section in much more marked in top performers. The performance in 100m-sprint depends on how a runner maintains his velocity throughout the race. So, it is a matter of importance to analyze the velocity pattern of the sprinter. The present study has been planned to study and analyze this aspect of sprinting. The main purpose was to find out the characteristic features of the velocity of sprint running. The 100m performance can be divided into three stages: acceleration, maintenance, and deceleration

### 2. Methodology

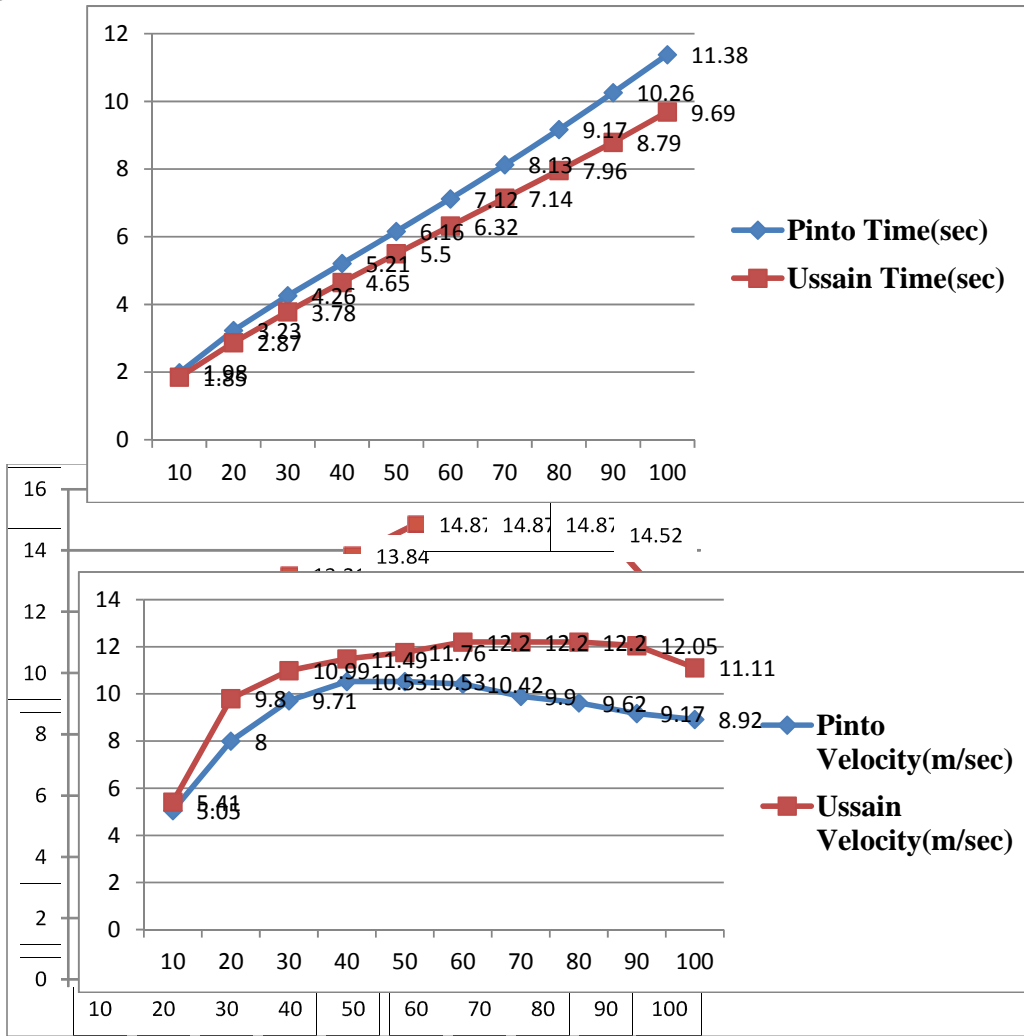
The data was collected on the standard synthetic athletic track of Delhi. The subjects were allowed to complete warming up for 20 minutes. The total course of the 100m race was divided into 10 equal with distinctive marking. The time keepers at each zone were placed to record the time taken by the athletes to complete the distance up to the zone from start. Thus, the time keepers were posted at 10m, 20m, 30m, 40m, 50m, 60m, 70m, 80m, 90m, and 100m points. The starter was appointed at the starting line to start the race using a clapper. The total course of the 100m-sprint would be divided into 10 equal parts and indicated by distinctive markings. The time for each subject at each point was recorded by three times and the best time was considered as the score. The performance of the Amity University sprinters was compared with the similar data of international level sprinter. For this purpose Usain Bolt, the current world record holder in 100m was selected as an elite sprinter. Performance of the male sprinters was compared with Usain Bolt. This comparison facilitated to find out the weak

**Correspondence:**  
**Dr. Inder Singh Pal**  
Asst. Prof., AUUP, Uttar  
Pradesh, India

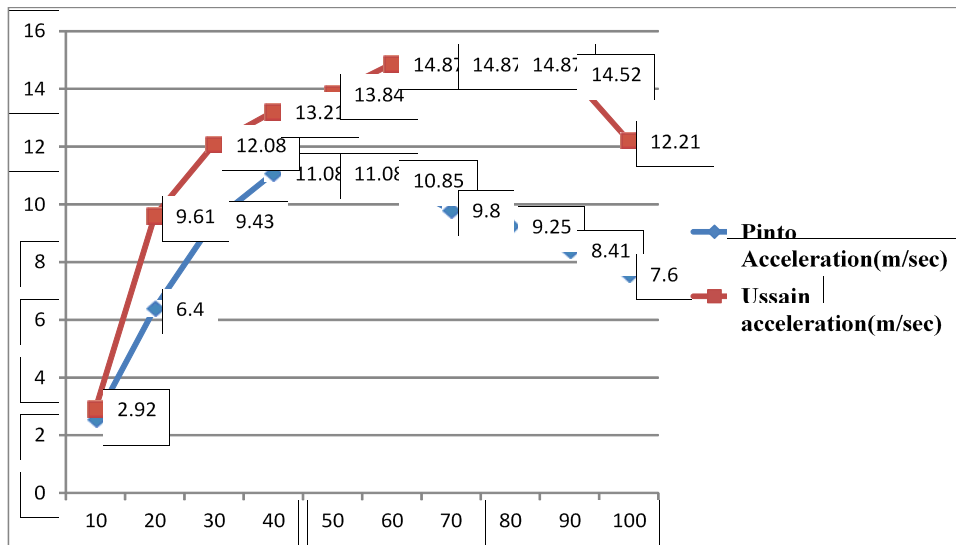
points of the Amity University sprinter. Single Group Experimental Design was used in the study. In as much as sports training an individual process, the performance of each

Amity University sprinters was separately compared to that of the international level sprinter (Usain Bolt).

**3. Results**



Distance(m)	10	20	30	40	50	60	70	80	90	100
Acceleration(m/sec)	2.55	6.40	9.43	11.08	11.08	10.85	9.80	9.25	8.41	7.60
Acceleration(m/sec)	2.92	9.61	12.08	13.21	13.84	14.87	14.87	14.87	14.52	12.21



Distance(m)	10	20	30	40	50	60	70	80	90	100
Acceleration(m/sec)	2.55	6.40	9.43	11.08	11.08	10.85	9.80	9.25	8.41	7.60
Acceleration(m/sec)	2.92	9.61	12.08	13.21	13.84	14.87	14.87	14.87	14.52	12.21

Fig.3: Distance-Acceleration Curves of Pinto and Usain Bolt

#### 4. Discussion

The purpose of the study was to compare distance-time of university level sprinters with an elite sprinter as well as to compare distance-speed and distance-acceleration curves of university level sprinters with an elite sprinter. Good International level sprinters take 0.13 to 0.17 seconds to respond to the auditory stimulus (pistol sound) and thereafter clear the blocks as quickly as possible. Then they enter in to acceleration phase which in the case of international sprinters is almost between 60 to 65mts. All the five sprinters of Amity University have much shorter acceleration distances i.e. 40 to 50mts. As a result of short acceleration distance and a very short speed maintenance phase, Amity University sprinters decelerated over a much longer distance as compared to Usain Bolt.

Speed performance depends upon length of the stride and frequency of stride. The research has revealed that when the sprinters gets tired his frequency declines and in order to compensate the loss of frequency, in the last 10mts. the athlete is instructed to slightly increase the length of stride in order to compensate for the loss of frequency. Not only in the case of Amity University sprinters the deceleration distance was more but all of them also had poor finish time i.e. they did not increase the length of stride in the last 10mts. In the view of the reasons described above the performance of the Amity University sprinters is poor. It is required that they undergo systematic training for enhancement of sprint performance.

#### 5. References

1. [http://www.iopireland.org/education/resources/physics-in-time/page\\_53388.html](http://www.iopireland.org/education/resources/physics-in-time/page_53388.html)
2. <https://www.google.co.in/#q=definition+of+time+in+physics>
3. <http://www.ask.com/question/what-is-the-scientific-definition-of-time>
4. <http://www.ask.com/question/what-is-speed-in-physical-education>
5. <http://in.answers.yahoo.com/question/index?qid=20090426222122AASwNjV>
6. <http://bjssportmed.com/content/15/3/177.abstract>
7. [http://journals.lww.com/nscajsr/Abstract/2008/01000/The\\_Acute\\_Effects\\_of\\_Heavy\\_Back\\_and\\_Front\\_Squats.24.aspx](http://journals.lww.com/nscajsr/Abstract/2008/01000/The_Acute_Effects_of_Heavy_Back_and_Front_Squats.24.aspx)