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Comparison of medium and bullet starts on speed in young sprinters

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Abstract
Introduction: Sprint start along with the starting blocks and Spikes are compulsory in all sprint events in athletics. There are three types of sprint starts i.e. Bunch or Bullet start, Medium start and Elongated start. The difference between these starting positions is found during the on your marks part of the start. The Start has three phases on your mark, set and gun will be fired.
Aim: The purpose of the study is to find the difference in Medium Start and Bullet Start among young Sprinters.
Methodology: The total number of students in this study were 20 young sprinters between 19-22 years out of which 10 subjects were included each in medium start (n=10) and bullet start group(n=10). The 50 M Run is used to assess the speed in Medium Start Group and Bullet Start Group.
Result: After the analysis, the results of the study shows that in Medium start timing is faster than the Bullet start in 50 M.
Conclusion: It concluded that medium start is faster in speed compare to the bullet start. Hence it is recommended medium start is good for sprinters to enhance the performance.

Keywords: Medium start, bullet start, sprinters

Introduction
Sprints are short running events in athletics and track and field. In any sprinting, the starting is the most important factor for predicting success. So, there is a need to have an efficient starting type in the sprinting events. The important thing is to reach top speed as quickly and smoothly as possible, and this can only be done if the rhythm of the stride begins actually in the starting blocks. Movement from the set position in the sprint start must not only be fast and forceful but should permit the sprinter to rapidly take up a mechanically efficient running position.
To perform their best performance, the faster sprinters in the world have reached a very high running velocity (around 11.98–12.42 m.s−). To reach this high velocity, the starting block phase is extremely important in a 60 m and 100 m sprint. This phase is greatly influenced by the adjustment of the block positions (spacing and obliquities). Hay has commented that of all the sports techniques that have been subjected to biomechanical analysis, few have been more thoroughly examined than the sprint start. Scientific research on sprint starting dates back as far back as 1927 when Bresnahan investigated the difference between starting from holes dug in the ground and starting from blocks. Research has dealt with many factors that affect the sprint start such as the angle of the blocks, the block spacing, the forces exerted against the blocks, and the body position during the "set" phase of the sprint start.
The sprint start is a motor skill. Magill refers to a motor skill as "…an action or a task that has a goal and that requires voluntary body and/or limb movement to achieve the goal". Specifically, the sprint start could be categorized as a gross, continuous, closed motor skill. It is a "gross" skill in that it involves large musculature and the precision of movement is not as important to the successful execution of the skill as it is for fine motor skills. It can be considered "continuous" because the performer determines the beginning and end points of the skill and they are not specified by the skill itself. On the open-closed continuum the sprint start is closer to the closed anchor point than the open, since it takes place under fixed, unchanging, environmental conditions.
The sprint start is to facilitate an efficient displacement of the athlete in the direction of the run.

It enables the sprinter to start the race with his/her body sloping as required for acceleration. In starting, the emphasis is upon getting away from the mark as quickly as possible, and then into a position that will be favourable to developing the desired pace in the shortest distance.

A starter gives three commands to start a sprint race. These are "On your marks"; "Set" and then "Go" or else a gun is fired. When the athlete hears the initial command, "On your marks", he/she moves forward and adopts a position with the hands shoulder width apart and just behind the starting line. The feet are in contact with the starting blocks and the knee of the rear leg is in contact with the track. On hearing the command "Set" the athlete raises the knee of the rear leg off the ground and thereby elevates the hips and shifts the centre of gravity up and out. Then on the command "Go" or when the gun is fired the athlete reacts by lifting the hands from the track, swinging the arms vigorously and driving with both legs off the blocks and into the first running strides. There are three types of sprint starts:

- **Bunch or Bullet start:** The toes of the rear foot are approximately level with the heel of the front foot and both feet are placed well back from the starting line.
- **Medium start:** the knee of the rear leg is placed opposite a point in the front half of the front foot.
- **Elongated start:** the knee of the rear leg is level with or slightly behind the heel of the front foot.

Need for the Study

The most of the sprinters using starting blocks. Starting Blocks improve a sprinter's time in a race, but which starting block has greater speed is unknown, so the study is conducted to compare these both starts in young sprinters.

Materials and Methodology

Materials Required

- Measuring tape or marked track
- Stopwatch
- Cone markers
- Flat and clear surface of at least 70 meters
- Paper and pen

Source of Data

Subjects will be collected from Roever College of physiotherapy in Perambalur.

Study Design: Comparative study design

Sample Technique: Purposive sampling

Duration of Study: 1 month

Statistical Tool: 50M sprint test

Sample Size: Sample size is 20

Inclusion Criteria

- Male sprint runners
- Age should be between 19yrs to 21 yrs

Exclusion Criteria

- History of upper or lower limb injury within past 6 months
- Systemic illness
- Musculoskeletal and neurological disorders
- Recent surgeries
- Marathon runners

Outcome Measure

50m sprint test

Procedure

- The test involves running a single maximum sprint over 50 meters, with the time recorded. A thorough warm up should be given, including some practice starts and accelerations.
- Start from a stationary standing position (hands cannot touch the ground), with one foot in front of the other.
- The front foot must be behind the starting line.
- Once the subject is ready and motionless, the starter gives the instructions "set" then "go". The tester should provide hints for maximizing speed (such as keeping low, driving hard with the arms and legs) and the participant should be encouraged to not slow down before crossing the finish line.

Data Analysis

Table: Comparison of bullet and medium start

50M sprint test	N	Mean	Std. Deviation	Std. Error Mean	t-value	df	Sig.
Bullet Start	10	8.99	0.54	0.12	3.32	18	0.03
Medium Star	10	8.25	0.45	0.06			

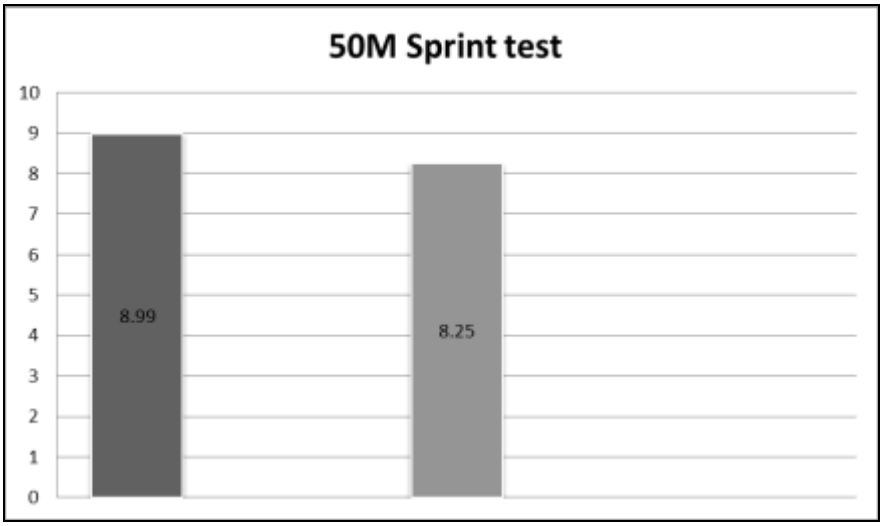

Fig 1: 50M Sprint test

Result

- Two trials are allowed, and the best time is recorded to the nearest 2 decimal places.
- The timing starts from the first movement (if using a stopwatch) or when the timing system is triggered, and finishes when the chest crosses the finish line and/or the finishing timing gate is triggered.
- The Table showing the Mean, S.D, Standard Error, t-ratio of Sprinters in Medium Start and Sprinters in Bullet Start in 50 Meters Run.
- The Sprinters Bullet start mean performance in 50 M Run is 8.99 and Standard Deviation is 0.54
- Sprinters medium Start mean performance in 50 M Run is 8.25 and Standard Deviation is 0.45
- The results of the study shows that in Medium crouch start mean timing is faster than the bullet crouch start mean timing in 50 M Run. The t-value is 3.32.

Discussion

This study was designed to compare the medium and bullet start in sprinters. Result of this study shows that there was a noticeable difference between start techniques at both. The bullet start was observed to be significantly slower than the medium start. Although participants practiced each technique for understanding and implementation, experience with the technique was limited to the pre-experiment practice session. Participants did have prior experience with both the bullet and medium techniques prior to the study.

The medium or Neutral start is the preferred method as it offers the most advantage to the sprinter. Compared to the other two starts it allows the sprinter to exert a higher force against the blocks for the longest practicable time which in turn produces the maximum impulse so that the athlete leaves the blocks with the greatest possible velocity.

Conclusion

The study concluded that Medium Start is having better speed and advantage in Sprints compare to the Bullet Start. Hence it is recommended medium start is good for sprinters to enhance the performance.

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